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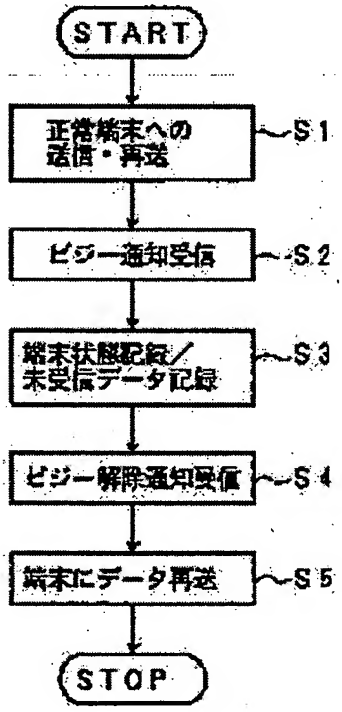
(71)Applicant : NIPPON TELEGR & TELEPH CORP <NTT>
(72)Inventor : SHIROSHITA TERUJI
TAKAHASHI OSAMU
YAMASHITA MASAHIDE

(54) DATA RESENDING METHOD AND SERVER

(57)Abstract:
PROBLEM TO BE SOLVED: To improve the efficiency of data transfer to all of many terminals by making a server transmit and retransmit data preferentially to many normal terminals and resend only unreceived data to a terminal which becomes busy and a terminal with low receiving performance at server's convenient time.
SOLUTION: This server performs the data transmission and retransmission preferentially to many normal terminals (step 1) and retransmits only the unreceived data to the terminal which becomes busy and the terminal with low receiving performance at server's convenient time (step 2). Further, the server records the states of the terminals and the status of the unreceived data and performs individual state management different from the states of other normal terminals (step 3), and when a busy state reset report showing that reception is enabled is received from the terminal (step 4), the state of the terminal and the status of the unreceived data are referred to, thereby resending the data to the terminal at server's convenient time according to the record.



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(71)出願人　000004226
日本電信電話株式会社
東京都新宿区西新宿三丁目19番２号

(72)発明者　城下　輝治
東京都新宿区西新宿三丁目19番２号　日本電信電話株式会社内

(72)発明者　高橋　修
東京都新宿区西新宿三丁目19番２号　日本電信電話株式会社内

(72)発明者　山下　正秀
東京都新宿区西新宿三丁目19番２号　日本電信電話株式会社内

(74)代理人　弁理士　伊東　忠彦

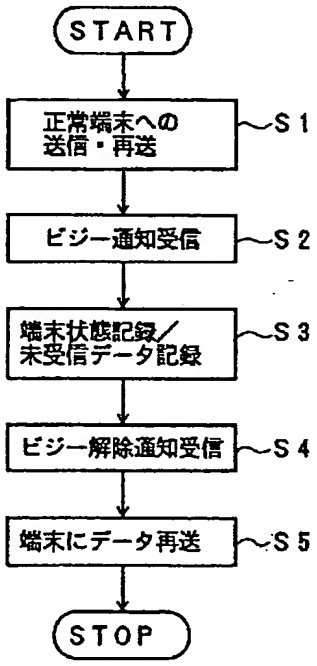
(54)【発明の名称】　データ再送方法及びサーバ

(57)【要約】

【課題】　サーバがある端末からビジー通知を受信したとき、サーバはこの端末を他の正常端末と同等に状態管理を行うと、他のビジーでない正常端末へのデータ送信、再送も中断してしまう。

【解決手段】　本発明は、サーバは、一時的に受信不能となった端末からビジー通知を受けた場合に、端末の状態を記録し、端末の状態と未受信データの状況を記録し、他の正常端末の状態とは別の個別状態管理とし、端末から受信可能となったことを示すビジー解除通知を受け取った場合には、端末の状態と未受信のデータの状況を参照し、該記録に基づいて、サーバの都合がよいときに、端末へのデータの再送を行う。

本発明の原理を説明するための図



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【 特許請求の範囲】

【 請求項1 】　通信ネットワークを介して接続される複数の端末に対して、サーバがデータ送信を行い、該端末がデータの全てを受信できない場合に再度データの再送を行う データ再送方法において、

前記サーバは、多数の正常端末への送信、再送を優先してデータ送信を行い、

サーバの都合のよいときに、未受信データのみをビジーとなった端末や受信性能の低い端末へ再送ことを特徴とするデータ再送方法。

【 請求項2 】　前記サーバは、データの全てを正常に受信できた端末の状態管理表Aから、データの全てを正常に受信できなかった端末に対応する、または、複数の状態管理表を派生し、

送信の進行に従った前記状態管理表Aの状態遷移と並行して、別の状態管理を行う 請求項1 記載のデータ再送方法。

【 請求項3 】　前記サーバは、

一時的に受信不能、または、受信能力が低下した端末から、その旨の信号を受けた場合には、前記状態管理表Aにおける当該端末の遷移を凍結し、該状態を記録し、その後、当該端末から受信可能となった旨の信号を受け取った場合には、当該端末の状態と、未受信のデータの状況を、前記凍結記録された状態から復元し、当該端末へのデータ送信を再開する請求項2 記載のデータ再送方法。

【 請求項4 】　前記サーバは、

一時的に受信不能、または、受信能力が低下した端末から、その旨の信号を受けた場合には、前記状態管理表Aにおける、当該端末の状態遷移を凍結記録し、状態管理表Bを新たに開き、状態を前記状態管理表Aから引継ぎ、

前記状態管理表Bに従って、前記端末への再送制御を実行し、その後、当該端末から受信可能となった旨の信号を受け取った場合には、前記端末の状態遷移を、前記状態管理表A上で再開し、その際に、前記状態管理表Bの状態から未受信データの状況を引継ぎ、前記端末へのデータ送信を再開する請求項2 記載のデータ再送方法。

【 請求項5 】　通信ネットワークに接続される複数の端末間でデータ送信を行い、該端末がデータの全てを受信できない場合に再度データの再送を行う サーバにおいて、

前記サーバは、

正常端末への送信、及び再送の状態管理と、ビジー通知を発行した端末、受信性能が低いと判断した端末の状態管理を分けて行う 管理手段と、

前記管理手段に基づいて端末へのデータ送信を行う 送信手段とを有することを特徴とするサーバ。

【 請求項6 】　前記管理手段は、

送信データを正常受信した正常端末の状態を管理する正常端末管理手段と、

前記端末の状態として、ビジー状態、ビジー解除状態、低性能状態をそれぞれ個別に管理する個別管理手段とを有する請求項5 記載のサーバ。

【 請求項7 】　前記管理手段は、

前記正常端末管理手段で管理されていた端末が正常状態から異常状態に遷移した場合には、前記個別管理手段に管理を移行し、前記個別管理手段で管理されていた端末が正常状態に遷移した場合には、正常端末管理手段に移行する状態管理移行手段を更に有する請求項5 記載のサーバ。

【 請求項8 】　前記個別管理手段は、

端末からビジー通知を受信すると、端末におけるパケットの受信・未受信を記憶する再送管理手段と、

前記端末から前記ビジー通知を受け取った場合には、ビジーであることを管理し、ビジー解除通知を受け取った時にデータ再送が可能であることを管理する端末状態管理手段とを有する請求項6 記載のサーバ。

【 請求項9 】　前記個別管理手段は、

前記端末から前記送信データに対する否定応答があった場合に、該端末が低性能であるかを判定する第1 の低性能判定手段と、

前記端末から前記送信データに対する応答がない場合に、所定の回数のタイムアウトを越えて応答がない場合に低性能端末と判定する第2 の低性能判定手段と、

前記第1 の低性能判定手段または、前記第2 の低性能判定手段において、低性能と判定された端末を前記正常端末管理手段から除外する除外手段とを有する請求項6 記載のサーバ。

【 請求項1 0 】　前記送信手段は、

前記正常端末管理手段において管理されている前記正常端末へのデータ送信を優先させ、次いで前記正常端末への送信が終了後に前記個別管理手段により管理されているビジー通知の発行元の端末または、前記低性能端末のうち、個別送信が可能と判定された端末にデータの再送を行う 請求項5 記載のサーバ。

【 請求項1 1 】　前記ビジー解除通知には、未受信のパケット番号を含む請求項8 記載のサーバ。

【 発明の詳細な説明】

【 0 0 0 1 】

【 発明の属する技術分野】本発明は、データ再送方法及びサーバに係り、特に、サーバが複数の端末に対してマルチキャスト（ 宛先指定同報） 等によりデータ送信を行い、受信データの紛失や誤りがあった場合に、サーバから端末に再送を行う データ再送方法及びサーバに関する。

【 0 0 0 2 】

【 従来の技術】一般に、サーバが複数の端末に対してデータを送信するデータ通信においては、送信側のサーバが一連のデータを適当な大きさのデータ（ 以下、パケッ

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トと呼ぶ）に分割して複数の端末に送信した後、各端末は、正常受信の肯定応答あるいは未受信のデータに関する情報を否定応答としてサーバに返し、サーバはこれらの応答に基づいて再度複数の端末に対してパケットの再送を行う。

【０００３】図１４は、従来の複数端末へのデータ再送シーケンスを示す図である。サーバが複数端末に対してデータ送信した後、各端末から応答を返し、これらの応答に基づいてサーバが再送データを生成し、データ再送を行う手順を繰り返していることを示している。

【０００４】同図において、サーバから端末1、2、3の3つの端末に対して、データ送信を行う。これにより、端末から正常受信または、異常受信の旨が応答される。ここで、サーバが端末1、2、3にデータ送信した結果、正常応答があったのは、端末1だけであるので、端末2、3に対してデータの再送を行う。ここで、端末2からは正常受信の旨の応答があったが、端末3からは異常応答であるので、再度、サーバは、再送データを生成して、当該データを端末3にデータを再送する。

【０００５】また、従来の記述では、端末が一時的に受信不能（ビジー）となった時に、サーバに対して、ビジー通知を送信し、当該ビジー端末へのデータ送信の中断を要求し、当該端末が受信可能となった時に、端末がビジー解除通知を送信するデータ再送方式がある。図１５は、従来のビジー通知によるデータ再送シーケンスを示す。サーバがデータ送信中に一時的に受信不能となった端末（ビジー端末）からビジー通知を受けると、当該端末へのデータ送信を中断し、当該端末からビジー解除通知を受信した後データ送信を再開する手順を示している。

【０００６】同図において、サーバが端末に対してデータを送信すると、端末がビジーであるため、一時的に受信不能状態にある例である。この場合は、サーバからデータを送信しても、端末からビジー通知が発行されるため、サーバは、このビジー通知を受信すると、データ送信を中断する。さらに、端末が受信可能状態に遷移すると、ビジー解除通知をサーバに送信する。これにより、サーバは、端末に対してデータの送信を再開する。

【０００７】

【発明が解決しようとする課題】しかしながら、上記の２つの従来方式を組み合わせて用いるときに、サーバがある端末からビジー通知を受信したとき、サーバはこの端末を他の正常端末と同等に状態管理を行うと、他のビジーでない正常端末へのデータ送信、再送も中断してしまうのでデータ通信全体の効率が著しく低下するという問題がある。

【０００８】また、同じ状況で、当該端末への通信を状態管理から外してしまうと当該端末への再送は受信済みのデータも含めて最初からやり直す必要があり、当該端末への通信効率が著しく低下する。また、上記従来技術

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の前者の方式において、データ受信状況のよくない端末を他の多くの正常端末と同等に扱うと、この端末の受信性能に引きずられて、再送の回数が増えるにつれ、端末全体へのデータ通信効率が低下するという問題がある。

【０００９】また、同じ状況で、当該端末への通信を状態管理から外してしまうと当該端末への再送は受信済みのデータも含めて最初からやり直す必要があり、当該端末への通信効率が著しく低下する。以上の問題は、特にサーバが1度の送信処理で複数の端末に対して同報を行うマルチキャスト通信においてデータ再送を行う場合に顕現する。

【００１０】本発明は、上記の問題点に鑑みてなされたものであり、多数の正常端末への送信、再送を優先して、ビジーとなった端末や受信性能の低い端末への再送はサーバの都合のよいときに、受信済みのデータの再送を行うことなく、未受信データのみを当該端末に再送することを可能とし、当該端末への再送データを軽減しつつ多数の正常端末への送信を優先して行うことが可能な、データ再送方法及びサーバを提供することを目的とする。

【００１１】

【課題を解決するための手段】本発明は、通信ネットワークを介して接続される複数の端末に対して、サーバがデータ送信を行い、該端末がデータの全てを受信できない場合に再度データの再送を行うデータ再送方法において、サーバは、多数の正常端末への送信、再送を優先してデータ送信を行い（ステップ１）、サーバの都合のよい時に、未受信データのみをビジーとなった端末や受信性能の低い端末へ再送する（ステップ２）。

【００１２】また、本発明は、サーバにおける各端末の状態管理を行う際に、正常端末の状態から一つまたは複数の個別状態管理を派生し、正常端末の状態管理と平行して、個別状態管理も行う。図1は、本発明の原理を説明するための図である。

【００１３】本発明において、サーバは、一時的に受信不能となった端末からビジー通知を受けた場合に（ステップ２）、端末の状態を記録し、端末の状態と未受信データの状況を記録し、他の正常端末の状態とは別の個別状態管理とし（ステップ３）、端末から受信可能となったことを示すビジー解除通知を受け取った場合には（ステップ４）、端末の状態と未受信のデータの状況を参照し、該記録に基づいて、サーバの都合がよいときに、端末へのデータの再送を行う（ステップ５）。

【００１４】また、本発明において、サーバは、端末の受信状況が良好でない時に、該端末を他の正常端末の状態とは別の個別状態管理とし、当該端末の状態と未受信データの状況を記録し、記録に基づいて、サーバが都合の良い時に当該端末へのデータの再送を行う。

【００１５】図2は、本発明の原理構成図である。本発明は、通信ネットワークに接続される複数の端末間でデ

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ータ送信を行い、該端末がデータの全てを受信できない場合に再度データの再送を行うサーバ１００において、サーバ１００は、正常端末への送信、及び再送の状態管理と、ビジー通知を発行した端末、受信性能が低いと判断した端末の状態管理を分けて行う管理手段１０と、管理手段１０に基づいて端末へのデータ送信を行う送信手段３０とを有する。

【００１６】上記の管理手段１０は、送信データを正常受信した正常端末の状態を管理する正常端末管理手段４０と、ビジー状態、ビジー解除状態、低性能状態をそれぞれ個別に管理する個別管理手段２０を有する。上記の管理手段１０は、正常端末管理手段４０で管理されていた端末が正常状態から異常状態に遷移した場合には、個別管理手段２０に管理を移行し、個別管理手段２０で管理されていた端末が正常状態に遷移した場合には、正常端末管理手段４０に移行する状態管理移行手段を更に有する。上記の個別管理手段２０は、端末からビジー通知を受信すると、端末におけるパケットの受信・未受信を記憶する再送管理手段２１と、端末からビジー通知を受け取ると、ビジーであることを管理し、ビジー解除通知を受け取ると、データ再送可能であるとを管理する端末状態管理手段２２とを有する。

【００１７】上記の個別管理手段２０は、端末から送信データに対する否定応答があった場合に、該端末が低性能であるかを判定する第1の低性能判定手段２３と、端末から送信データに対する応答がない場合に、所定の回数のタイムアウトを越えて応答がない場合に低性能端末と判定する第2の低性能判定手段２４と、第1の低性能判定手段２３または、第2の低性能判定手段２４において、低性能と判定された端末を正常端末管理手段４０から除外する除外手段２５とを有する。

【００１８】上記の送信手段３０は、正常端末管理手段４０において管理されている正常端末へのデータ送信を優先させ、次いで正常端末への送信が終了後に、個別管理手段２０により管理される、ビジー通知の発行元の端末または、低性能端末のうち、個別送信が可能と判定された端末にデータの再送を行う。

【００１９】また、ビジー解除通知には、未受信のパケットの識別子を含む。上記により、サーバ2において正常端末への送信、再送の状態管理とは別にビジー通知を受信した端末および受信性能が低いと判断した端末に対して正常端末とは別に状態管理を行うことにより解決される。具体的には以下の通りである。

【００２０】サーバ１００において、端末の状態（ビジー状態、ビジー解除状態、低性能状態、正常状態等）を記憶する端末状態管理手段２２と正常状態時とともにビジー通知受信後および低性能と判断した後も当該端末における各パケットの受信／未受信を記憶する再送管理手段２１を設ける。

【００２１】また、サーバに１００おいて端末が低性能

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状態であることを判定する第1、第2の低性能判定手段２３、２４を設ける。サーバ１００は、端末からビジー通知を受け取ったときに、当該端末がビジーになったことを端末状態管理手段２２に記録し、かつ、再送管理手段２１において各パケットの受信／未受信状態の記録をそのまま保持する。（当該端末の最近の受信状況は否定応答により記録されている。否定応答がない場合は、パケットは全て未受信である。）これにより、以降、ビジー端末の状態およびパケット受信状況は正常端末とは区別して管理できる。

【００２２】サーバ１００は、当該端末を正常端末から除外して他の端末への送信、再送を継続する。ビジー端末は、受信可能となったときにサーバにビジー解除通知を出し、サーバはビジー解除通知を受け取ると端末状態管理手段２２において端末がビジー解除されたことを記録する。ビジー解除通知には未受信パケットの番号を含めておき、サーバは再送管理手段のパケットの受信／未受信状態の記録を更新し保持しておく。

【００２３】サーバは、自己の都合が良い時に、例えば、正常端末への送信、再送終了後に、端末状態管理手段２２を参照してビジー解除されているビジー解除端末に対してデータ再送を行う。ビジー解除されていないビジー端末については、サーバは、ビジー解除通知が来るまで待ってから再送する。このサーバにおけるビジー解除通知待ちについては、タイマ監視により所定時間待つが、タイムアウトした端末については、通信を打ち切る。

【００２４】サーバは、第1、第2の低性能判定手段２３、２４において、端末からの否定応答、未応答の状況に基づいて当該端末を低性能状態と判定し、当該端末が低性能になったことを端末状態管理手段２２に記録し、かつ、再送管理手段２１において各パケットの受信／未受信状態の記録をそのまま保持する。（当該端末の最近の受信状況は否定応答により記録されている。否定応答がない場合は、パケットは全て未受信である。）これにより、以降、低性能端末の状態およびパケット受信状況は正常端末とは区別して管理できる。

【００２５】特に、未応答のタイムアウトのについては、漠然と長い時間待つのではなく、問い合わせパケットにより、応答を督促し、タイムアウトを規定回数許容し、この回数を越えた時に、低性能と判定する。これにより、明確に低性能と判定でき、漠然と待機するより、短時間で判定し、次のラウンドの正常端末への送信（マルチキャストの場合は、マルチキャスト再送）に遷移できるので、効率の良いデータ再送を行うことができる。

【００２６】サーバは自己の都合の良いときに、例えば、正常端末への送信、再送の終了後に、低性能端末に対してデータ再送を行う。ビジー端末への再送、低性能端末への再送のいずれを優先するかはシステム毎に方針が異なってもよい。ビジー解除待ちの空き時間に低性能

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端末への再送を行うと効率がよい。

【００２７】以上により、サーバは正常端末へのデータ送信、再送を優先し、ビジー端末、低性能端末に対しても受信済みのデータを再送することなく未受信のデータのみを再送できる。この結果、正常端末へのデータ送信、再送を中断させたり性能劣化させることなく、また、ビジー端末、低性能端末への再送を最初からやり直す必要がなく、データ通信全体の効率を向上させることができる。

【００２８】

【発明の実施の形態】以下、本発明の実施例を図面を用いて説明する。図3は本発明を適用した情報通信システム構成を示す。同図に示すシステムは、サーバ１００、通信ネットワーク２００、複数の端末３００より構成される。同図のシステムは、サーバ１００が複数の端末３００にデータを送信した後、各端末３００から受信確認の肯定応答あるいは再送情報を含む否定応答を返送される様子を示している。

【００２９】図4は本発明の動作の概要を示す。サーバにおいて、正常端末の状態管理から、個別の状態管理が派生する様子を示している。同図は、サーバ１００から４つの端末３００－１、３００－２、３００－３、３００－4に対してデータ送信を行うシステムを示す。

【００３０】最初に、サーバ１００における特定のイベントにより、当該端末３００の個別状態管理を開始する。正常端末の管理と平行して一つまたは複数の個別状態管理を行う。例えば、図4ではサーバ１００がビジー通知を受信したときに、当該端末３００－3をビジー端末として状態管理を始める。サーバ１００が低性能と判定したときに当該端末３００－4の低性能端末としての状態管理が始まる。いずれの場合も、他の正常端末３００－１、３００－2の状態管理は継続する。

【００３１】図4において、サーバ１００が端末３００－１、３００－2、３００－3、３００－4に対してデータ送信を行うと、端末３００－１、３００－2からは、正常通知（データ受信完了通知）を受信し、端末３００－3からはビジー通知を受信する。このとき、端末３００－3に対しては、ビジー端末として個別状態管理を行う。さらに、端末３００－4については、異常通知が届いたため、個別状態管理を開始し、タイムアウトを所定回数以上繰り返したため、低性能と判定し、個別状態管理を行うものとする。

【００３２】図5は、本発明のサーバの構成を示す。同図に示すサーバ１００は、再送制御部１０１、通信制御部１０２、アプリケーション管理部１０３、再送管理部１０４、データ構成部１０５、端末状態管理部１０６及び、端末性能判定部１０７より構成される。

【００３３】再送制御部１０１は、アプリケーション管理部１０３からのデータ送信要求に基づいてデータ通信を通信制御部１０２を通して行う。送信データはデータ

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構成部１０５において構成される。再送管理部１０４では図6に示す再送管理テーブル１０４１により全端末３００のパケット受信状況（シーケンス番号が付けられた各パケットの端末毎の受信済み／未受信の区別）を管理している。ビジー端末の受信状況もこれに記憶されている。再送管理テーブル１０４１は、図6に示すように、各端末においてパケット番号に対応したパケットが受信済み（○）であるか、未受信（×）であるかを示すことができる。実装上は○にビットオン（１）、×にビットオフ（０）を対応させることにより、実現できる。

【００３４】再送管理テーブル１０４１は、パケット再送のための各端末のパケットの受信状況（パケット受信の成否）の管理に用いる。再送管理テーブル１０４１は、正常端末およびビジー端末、低性能端末で共用することができる。但し、処理効率の観点から、ビジー端末あるいは低性能端末の個別状態管理が始まった時点で当該端末に関するテーブルの行をコピーして端末ごとに別のテーブル（行のみ）を設け、これにより各端末の再送状況を管理することもできる。この場合には、各端末（ビジー端末、低性能端末）の個別再送が完了した時点で、元の再送管理テーブルに結果を報告することにより、元の再送管理テーブルにおいて端末全体のデータ再送の完了状況が把握できる。

【００３５】端末状態管理部１０６では、各端末毎に正常通信状態、ビジー状態、ビジー解除状態、低性能状態等のいずれの状態であるかを管理し記憶する。これは、通信ネットワーク２００を介して端末３００からの応答フレームの内容を解析して状態を認識する。

【００３６】図7に通信フレームの内容を示す。同図（Ａ）は、サーバ１００から端末３００に対して送信する問い合わせのフレームであり、端末宛先Ｐ０１、サーバ宛先Ｐ０２、パケット種別Ｐ０Ｔか構成される。サーバ宛先Ｐ０２は、問い合わせ時の発信元のサーバのアドレスを設定する。パケット種別Ｐ０Ｔは、問い合わせのデータのパケット種別を整数値で区別する。

【００３７】同図（Ｂ）は端末３００からサーバ１００に対して送信されるビジー通知を示し、サーバ宛先Ｂ０１、端末ＩＤ０２、パケット種別Ｂ０Ｔより構成される。パケット部種別Ｂ０Ｔはビジー通知の種別を整数値で設定する。同図（Ｃ）は、端末３００からサーバ１００に対して送信されるビジー解除通知を示し、サーバ宛先６０１、端末ＩＤ６０２、パケット種別６０Ｔ、未受信パケット番号列６０３より構成される。ここでパケット種別６０Ｔはビジー解除通知の種別を示す整数値を設定する。

【００３８】同図（Ｄ）は、センタ１００から端末３００に対して送信される低性能通知を示し、サーバ宛先６０１、端末ＩＤ６０２、および各端末におけるビジー解除通知送出時点での未受信パケットの番号列６０２を含む。未受信パケットの番号列は、通常、端末からの否定

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応答に含まれる未受信パケット番号列と同等であり、数値列、適当な範囲記号等を含んでいる。パケット種別D０Tは、低性能通知の種別を示す整数値を設定する。付加情報D０３は、個別再送の時期等の付加情報であり、端末において、いつ頃データ再送が再開されるのか知っていることにより予め受信準備が可能となる。

【００３９】端末性能判定部１０７は、端末３００からの応答に基づいて当該端末が低性能状態となったか否かを判定する。端末から否定応答、または、未応答のタイムアウトの状況に基づいて当該端末を低性能端末と判定し、その判定結果を端末状態管理部１０６に通知する。なお、未応答のタイムアウトについては、問い合わせパケットにより応答を催促し、タイムアウトが規定回数を越えた時に、低性能と判定する。

【００４０】図8は本発明のビジー端末と判定された場合の再送シーケンスを示す。同図において、センタ１００からデータを送信した際に、端末３００－3がビジー状態にあるものとし、端末３００－１、３００－2は正常状態であるとする。サーバ１００がデータ送信中に、端末３００－3よりビジー通知を受けると（ステップ１０１）、サーバ１００は当該端末３００－3がビジー状態になったことを端末状態管理部１０６に記録する（ステップ１０２）。サーバ１００は端末３００－3の状態をこれ以後、正常端末とは別に管理する。ビジー端末の記録後もサーバは正常端末への送信、再送、応答受信等の通信を継続する。

【００４１】次に、端末３００－3からビジー解除通知を受信する（ステップ１０３）と、サーバ１００は端末３００－3がビジー解除状態となったことを端末状態管理部に記録する（ステップ１０４）。同時に、ビジー解除通知に含まれている未受信パケット番号列を再送管理部１０４の再送管理テーブル１０４１に記録する。ビジー解除の記録後もサーバ１００は正常端末３００－１、３００－2との通信を継続する（ステップ１０５）。

【００４２】正常端末３００－１、３００－2への通信が完了後、サーバ１００は、ビジーが解除されている端末３００－3に対して未受信データの再送を行う（ステップ１０６）。図9は、本発明の低性能端末と判定された場合の再送シーケンスを示す。同図において、センタ１００からデータを送信した際に、端末３００－3からは受信応答がされないため、センタ１００は、タイムアウト等により低性能であると判定した場合について説明する。

【００４３】サーバ１００は応答受信中に端末３００－3を低性能端末と判定すると（ステップ２０１）、サーバ１００は当該端末３００－3が低性能状態になったことを端末状態管理部１０６に記録する（ステップ２０２）。同時に、端末３００－3からの否定応答に含まれている未受信パケット番号列を再送管理部１０４の再送管理テーブル１０４１に記録する。（否定応答もない場合は全パケット未受信と記録される。）また、サーバ１００は当該端末３００－3に対して低性能状態であり、データ転送が中断したことを低性能通知として伝える（ステップ２０３）。サーバ１００は端末３００－3の状態をこれ以後、正常端末とは別に管理する。低性能端末の記録後もサーバは正常端末への送信、再送、応答受信等の通信を継続する。

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【００４４】正常端末への通信が完了後（ステップ２０４）サーバ１００は、端末３００－3に対して未受信データの再送を行う（ステップ２０５）。

【００４５】

【実施例】以下に、本発明の実施例を図面と共に説明する。図１０は本発明を適用したサーバにおけるデータ再送手順（フローチャート）の例である。最初にビジー端末の扱いに関する実施例である。

【００４６】ステップ３０１）　再送制御部１０１は、アプリケーション０理部１０３からデータ送信要求を受けると、当該データ送信用に端末状態管理部１０６、再送管理部１０４を初期設定する。

ステップ３０２）　データ構成部１０５は最初の送信データを構成し、パケット分割して通信制御部１０２に転送する。通信制御部１０２は、パケット分割された送信データを正常端末への送信を開始する。以降、正常端末へのデータ送信（送信、再送、応答受信、応答受信待ちを含む）が完了するまで当該ステップの処理を行う。

【００４７】ステップ３０３）　端末状態管理部１０６は、この間に端末３００からビジー通知を受信すると当該端末のビジー状態の記録を行い、ビジー端末を正常端末の状態とは別に管理する。すぐに、正常状態へのデータ送信の処理に戻る。

ステップ３０４）　さらに、サーバ１００はビジー解除通知を受けると、端末状態管理部１０６にビジー解除の記録を行うとともに、ビジー解除通知の未受信パケットの番号に基づいて再送管理部１０４に端末の未受信パケットの状況を記録する。

【００４８】一度ビジー解除通知を発行した端末から再度ビジー通知を受けることも可能であり、この場合には、当該ステップにおいて再度、端末の状態をビジー状態として記録する。正常端末へのデータ送信がすべて完了したときに、ビジー端末への個別再送の処理ステップ３０５に移る。

【００４９】ステップ３０５）　サーバ１００は、ステップ３０４でビジー解除通知を受け取っているビジー端末に対して、再送管理テーブル１０４１を参照して未受信パケットの再送を行う。ビジー端末への個別再送中においても、再送中の端末を含めビジー解除済みの端末からビジー通知を受けることが可能であり、ステップ３０６で当該端末の状態をビジー状態として記録する。

【００５０】ステップ３０６）　ビジー端末の個別再送中においても、ビジー状態の端末からビジー解除通知を

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受けることが可能である。

ステップ３０７）　端末からビジー解除通知が通知された場合には、ビジー解除の記録を行うとともに、ビジー解除通知の未受信パケットの番号に基づいて再送管理部１０４に端末の未受信パケットの状況を記録する。

【００５１】ビジー端末への差別再送が終了したときにすべてのデータ送信を終了する。なお、ビジー端末が複数ある場合には、実装上、一つずつ端末への再送処理を行うことができるが、複数のビジー端末への再送を並列に行うこともできる。図１１は、本発明の一実施例のビジー端末がある場合のデータ再送の動作を示すシーケンスチャートである。。

【００５２】ステップ４０１）　まず、サーバのアプリケーション管理部１０３から送信用データが再送制御部１０１に渡されると、再送制御部１０１では、再送管理部１０４及び端末状態管理部１０７を初期設定を行う。データ構成部１０５は、送信データを取得すると、当該データをパケット分割して、宛先端末のアドレスを付与して、通信制御部１０２を介して端末A，端末B、端末Cにデータａを送信する。

【００５３】ステップ４０２）　ここで、サーバ１００は送信データａ（パケット番号“１”）に対して、端末Aからは、正常受信の応答があり、端末Bと端末Cからはビジー通知を受信する。

ステップ４０３）　端末状態管理部１０６は、再送制御部１０６を介して、当該端末Bと端末Cがビジーである旨を受け取ると、端末A，Bがビジー状態にあることを記録する。さらに、端末B，Cの状態を再送管理部１０４に通知すると、再送管理テーブル１０４１の端末B，Cのデータａの欄に未受信を示す“×”が記録される。端末Aの状態を再送管理部１０４に通知すると、再送管理部テーブル１０４１には、“○”が記録される。

【００５４】さらに、サーバ１００が端末B，Cビジー通知を受け取ったことにより、端末状態管理部１０６に、当該端末B，Cがビジー状態にあることを記録する。

ステップ４０４）　上記のステップ４０２において、正常受信している正常端末Aに対しては、データ送信を継続し、正常受信している場合にはこの処理を繰り返す。

【００５５】ステップ４０５）　サーバ１００がビジー状態にある端末Bビジー解除通知を受信する。

ステップ４０６）　サーバ１００は、再送管理部１０４の再送管理テーブル１０４１を参照して、当該端末Bに未送信のパケット（再送管理テーブルに×が付与してあるパケット：ここでは、データａとする）を認識し、当該データａを取得して、正常端末Aの送信終了後に、当該端末B１”に対してデータａの再送を行う。

【００５６】ステップ４０７）　さらに、ここで、端末Cビジー解除通知を受信する。

ステップ４０８）　サーバ１００は、上記のステップ４

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０５と同様の方法で、データａの再送を行う。このように、データの再送を行う場合には、端末のデータ受信、または、未受信の状態を再送管理部１０４の再送管理テーブル１０４１において管理し、当該テーブル１０４１を参照して再送の要否を決定する。また、端末がビジーであるか否かの管理は、端末状態管理部１０６において行い、例えば、端末３００がビジーである場合には、ビット＝1とし、端末３００からビジー解除通知を受信したらビット＝0とする。このビジー解除通知を受信したら、データ再送が可能となるので、再送管理テーブル１０４１を参照して、サーバ１００の都合のよいタイミングを選んで、当該端末３００にデータの再送を行うものである。

【００５７】次に、低性能と判定された端末に対してデータの再送を行う例を説明する。図１２は、本発明の一実施例のサーバから低性能端末へのデータ再送動作のフローチャートである。

ステップ５０１）　再送制御部１０１は、アプリケーション管理部１０３からデータ送信要求を受けると端末状態管理部１０６、再送管理部１０４を初期設定する。

【００５８】ステップ５０２）　データ構成部１０５は最初の送信データを構成し、パケット分割して通信制御部１０２に転送する。通信制御部１０２は、パケット分割された送信データを正常端末への送信を開始する。以降、正常端末へのデータ送信（送信、再送、応答受信、応答受信待ちを含む）が完了するまで当該ステップの処理を行う。

【００５９】ステップ５０３）　サーバ１００は、データ送信に対する端末３００からの応答を待機し、端末３００から否定応答があった場合に、端末性能判定部１０７は、再送制御部１０１から当該否定応答を取得し、応答送信元の端末３００の状態を判定する。

【００６０】ステップ５０４）　否定応答を発行した端末が端末性能判定部１０７において低性能端末と判定された場合には、端末状態管理部１０６は当該端末が低性能端末である旨を記録する。さらに、通信制御部１０２を介して当該端末に、低性能扱いとなった旨を通知し、再送が後回しとなったことを伝える。

【００６１】ステップ５０５）　また、データを送信した端末３００について、ｎ回のタイムアウトを設定し、タイムアウトの回数がｎ回を越えた時点で低性能と判定する。ここで、低性能と判定された場合には、ステップ５０６に移行し、それ以外は、ステップ５０９に移行する。

【００６２】ステップ５０６）　タイムアウトとなった端末３００については、個別再送可能かを判定する。再送管理部１０４は、再送管理テーブル１０４１を参照して、当該端末が全くパケットを受信していなければ、ステップ５０８に移行し、１つでもパケットを受信していれば（再送管理テーブル内にパケット番号に1つでも○が

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ある）、個別再送可能として、ステップ５０７に移行する。

【００６３】ステップ５０７）　ステップ５０６において、個別再送可能であると判定された場合には、再送管理テーブル１０４１を参照して、低性能状態のため個別再送することを記録し、当該端末に通知パケットにより個別再送扱いとなったことを通知し、個別再送に備える。

【００６４】ステップ５０８）　ステップ５０６において、当該端末が全くパケットを受信していない場合には、それ以上再送しても効果がないものと判定し、当該端末を再送の対象から除外する。

ステップ５０９）　ステップ５０５において規定のタイムアウト回数以内であれば、未応答の端末（複数あり得る）に問い合わせパケットを送出し、応答を催促し、応答待ちとなる。

【００６５】ステップ５１０）　正常端末へのデータ送信が完了した時点で、低性能端末への個別再送を行う。上記の低性能端末が存在する場合の動作を説明する。図１３は、本発明の一実施例の低性能端末についてのデータ再送動作のシーケンスチャートである。

【００６６】ステップ６０１）　サーバ１００から端末Ａ、端末Ｂ、端末Ｃにそれぞれデータａを送信する。

ステップ６０２）　端末Ａ及び端末Ｂから応答を受信する。これらの応答のうち、端末Ａからの応答は、正常受信を示す応答であったが、端末Ｂからの応答は、否定応答であるとする。これにより、端末状態管理部１０６は、端末Ａを正常端末管理とする。

【００６７】ステップ６０３）　サーバ１００は、端末Ｂの応答について、端末性能判定部１０７において当該否定応答が低性能を示すか否かを判定し、この例では、低性能と判定し、正常端末管理から除外する。従って、端末状態管理部１０６では、端末Ｂを異常端末として個別管理とする。

【００６８】ステップ６０４）　データ構成部１０５は、端末Ｂに図8（Ｄ）のパケットにおいて、付加情報として当該端末に対するデータ再送は後回しとなったことを設定し、端末Ｂに送信する。

ステップ６０５）　この間サーバ１００は、正常端末である端末Ａにデータｂ，ｃを送出する。

【００６９】ステップ６０６）　サーバ１００は、端末Ｃのタイムアウトを監視しており、この時点でタイムアウトを検出した。

ステップ６０７）　このタイムアウトの回数は、所定の回数ｎを越えているため、端末性能判定部１０７は、当該端末Ｃにデータを再送しても受信できないと判定し、端末状態管理部１０６の管理より除外する。

【００７０】ステップ６０８）　サーバ１００は、データｄを正常な端末Ａに転送する。

ステップ６０９）　サーバ１００は、データａを端末Ｂ

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に再送する。この例では、低性能端末への個別再送が全て終了した時にデータ送信処理が完了する。

【００７１】なお、低性能端末が複数ある場合には、実装上、一つずつ端末への再送処理を行うことができるが、複数の低性能端末への再送を並列に行うこともできる。以上、図１０，図１２でビジー端末の場合と低性能端末の場合を独立した例として説明したが、両者を合わせた場合も可能である。その場合、個別再送でビジー端末を優先するか、低性能端末を優先するかは任意である。例えば、原則としてビジー端末を先に再送するとして、すべてビジー解除通知待ちのときには低性能端末の再送を行うという実装ができる。

【００７２】このように、本実施例によれば、一時的に受信不能（ビジー）となった端末及びデータ受信状況のよくない端末への再送はサーバの都合のよい時に別扱いして行うこととし、大多数の正常端末への送信、再送を優先して行うことが可能である。

【００７３】

【発明の効果】上述のように本発明によれば、サーバにおいて、ビジー端末及び低性能端末の状態及び受信状態を記憶し、当該端末の状態を正常端末とは切り分けて管理することにより、正常端末へのデータ送信、再送終了後に当該端末に対して未受信であるデータだけを再送することがきる。その結果、ビジー端末及び低性能端末への無駄なデータの再送を防ぎつつ、正常端末へのデータ送信、再送を優先して、多数端末全体へのデータ転送効率を向上させる。

【図面の簡単な説明】

【図１】本発明の原理を説明するための図である。

【図２】本発明の原理構成図である。

【図３】本発明の適用する情報通信システム構成図である。

【図４】本発明の動作の概要を示す図である。

【図５】本発明のサーバ構成図である。

【図６】本発明の再送管理部が有する再送管理テーブルの例を示す図である。

【図７】本発明の通信パケットの構成例を示す図である。

【図８】本発明のビジー端末と判定された場合のデータ再送のシーケンスを示す図である。

【図９】本発明の低性能端末と判定された場合のデータ再送シーケンスを示す図である。

【図１０】本発明の一実施例のサーバからのビジー端末へのデータ再送の動作を示すフローチャートである。

【図１１】本発明の一実施例のビジー端末がある場合のデータ再送の動作を示すフローチャートである。

【図１２】本発明の一実施例のサーバから低性能端末へのデータ再送動作のフローチャートである。

【図１３】本発明の一実施例の低性能端末についてのデータ再送動作のシーケンスチャートである。

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【 図１４ 】従来の複数端末へのデータ再送シーケンスを示す図である。

【 図１５ 】従来のビジー通知によるデータ再送シーケンスを示す図である。

【 符号の説明】

１０　管理手段
２０　個別管理手段
２１　再送管理手段
２２　端末状態管理手段
２３　第1 の低性能判定手段
２４　第2 の低性能判定手段
２５　除外手段

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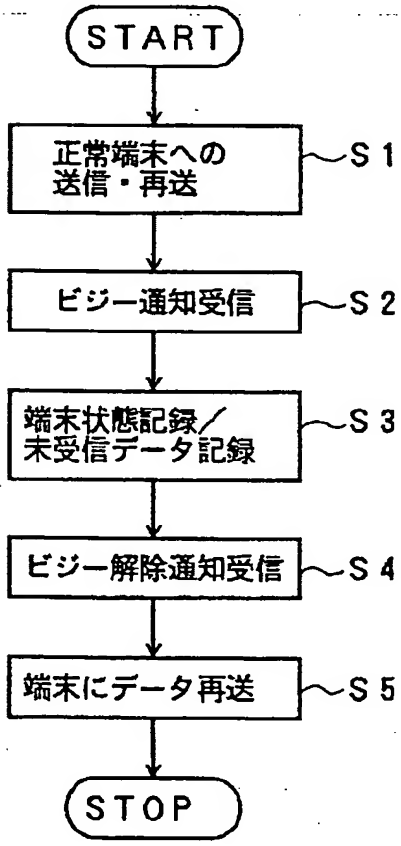
３０　送信手段
４０　正常端末管理手段
１００　サーバ
１０１　再送制御部
１０２　通信制御部
１０３　アプリケーション管理部
１０４　再送管理部
１０５　データ構成部
１０６　端末状態管理部
１０７　端末性能判定部
２００　ネットワーク
３００　端末

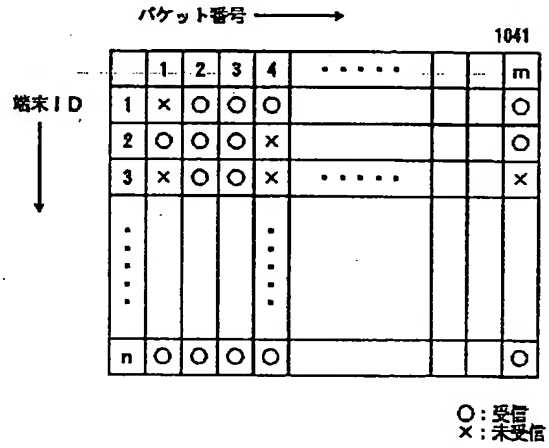
【 図1 】

本発明の原理を説明するための図



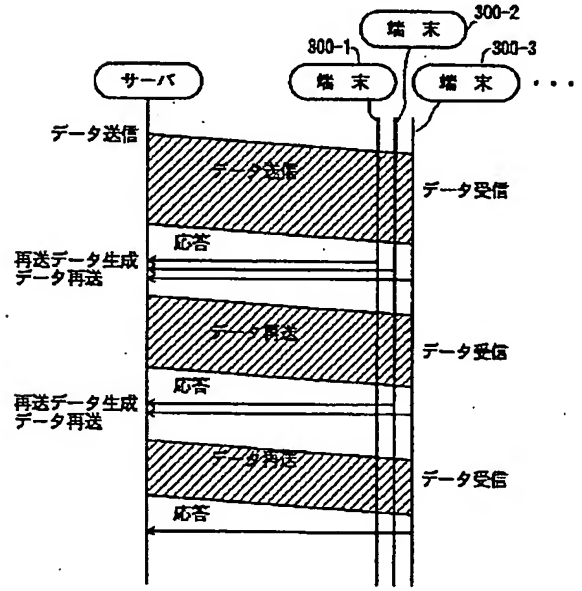
【 図6 】

本発明の再送管理部が有する再送管理テーブルの例を示す図



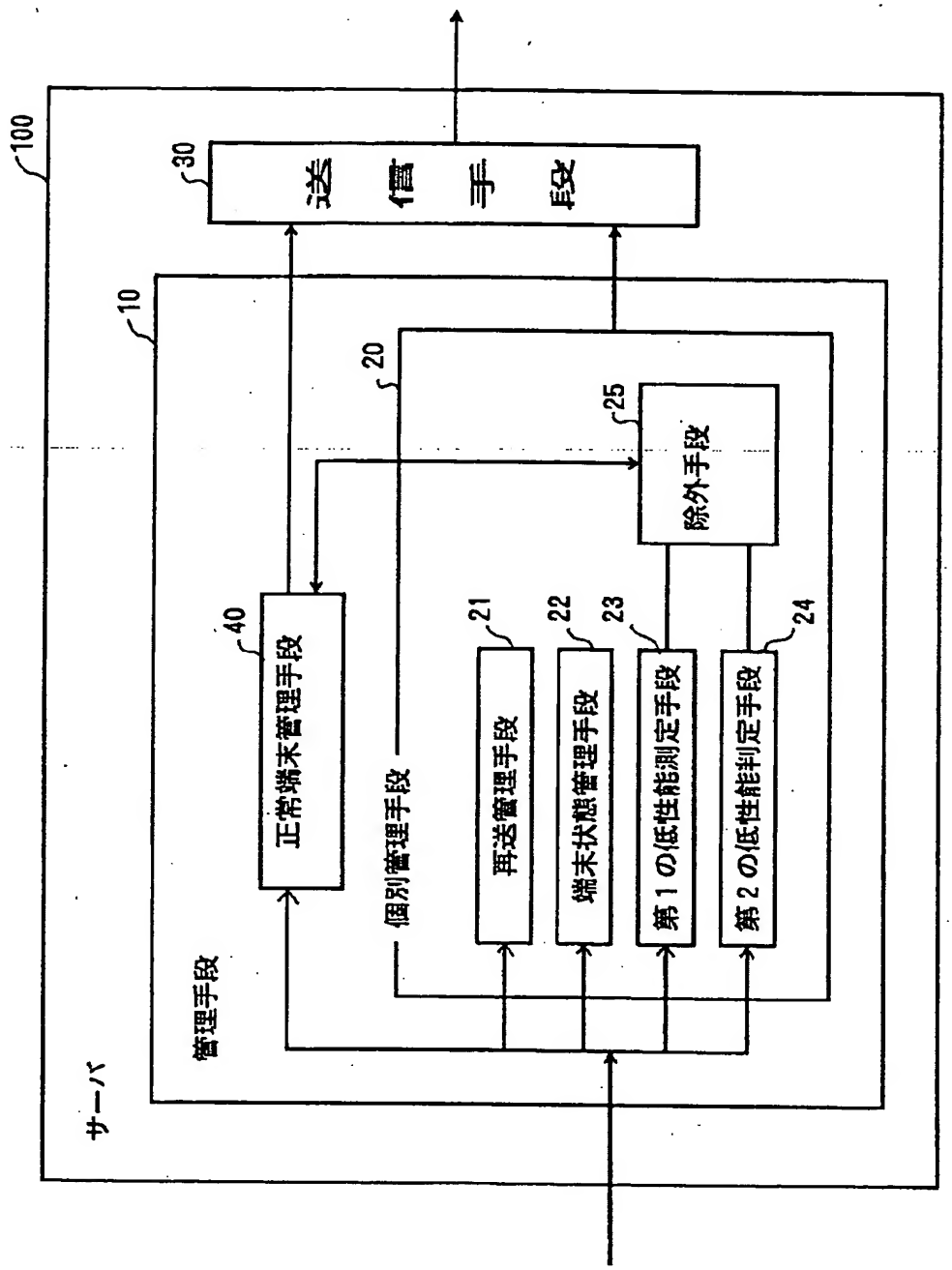
【 図１４ 】

従来の複数端末へのデータ再送シーケンスを示す図



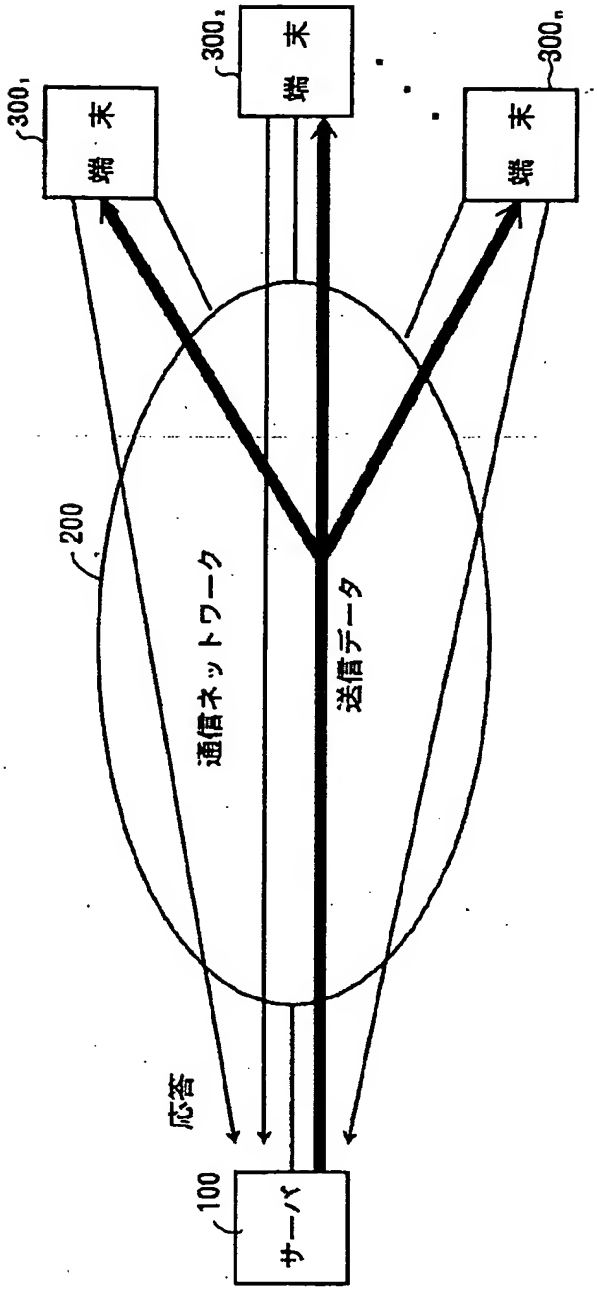
【 図2 】

本発明の原理構成図



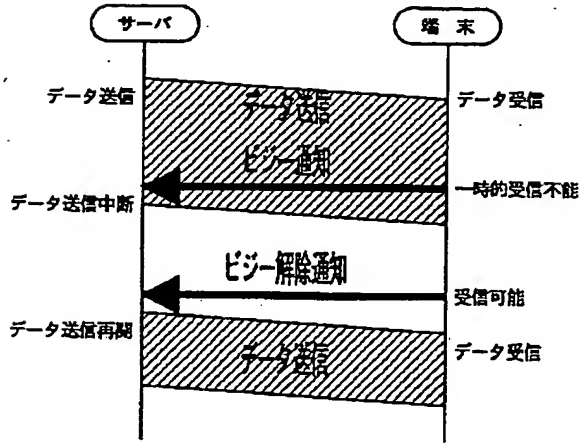
【 図3 】

本発明を適用する情報通信システム構成図



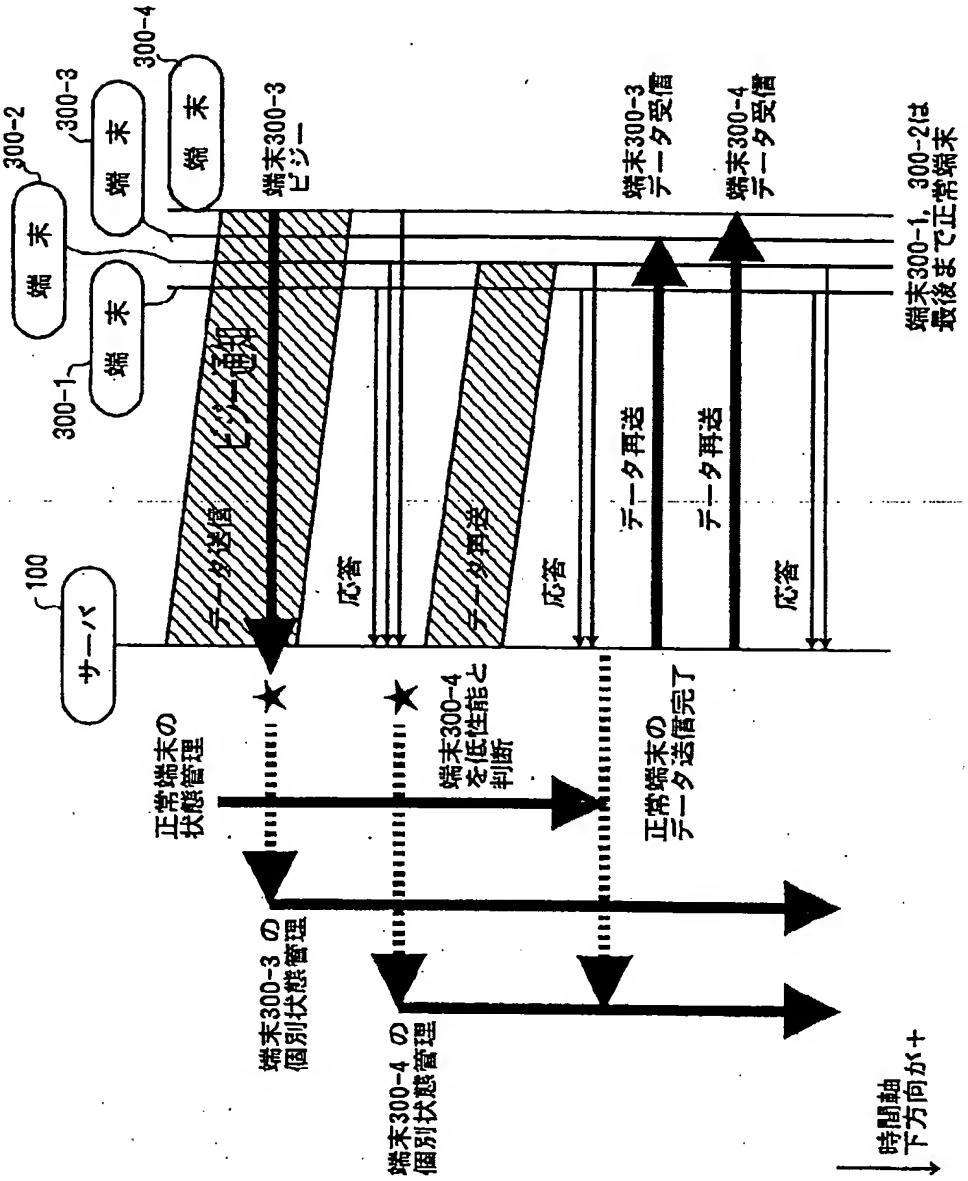
【 図15 】

従来のビジー通知によるデータ再送シーケンス



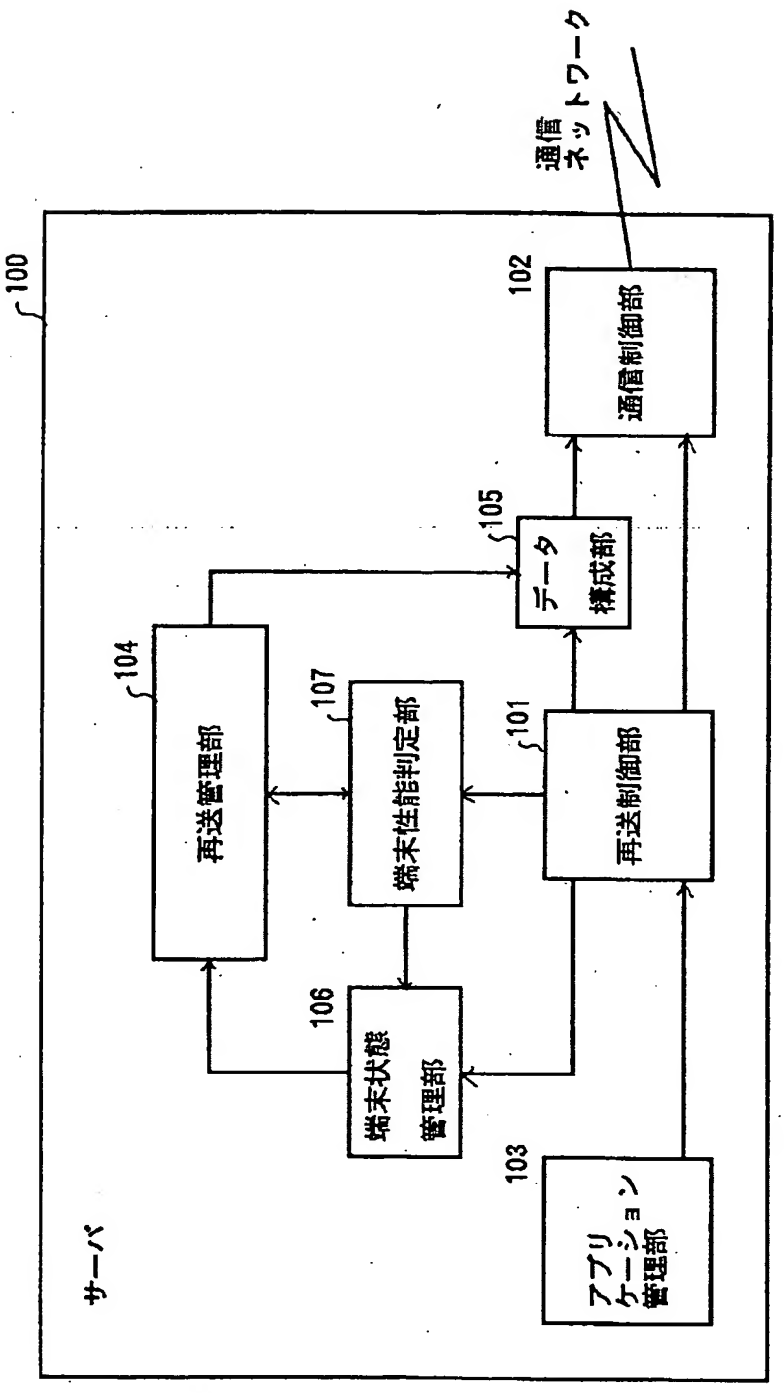
【 図4 】

本発明の動作の概要を示す図



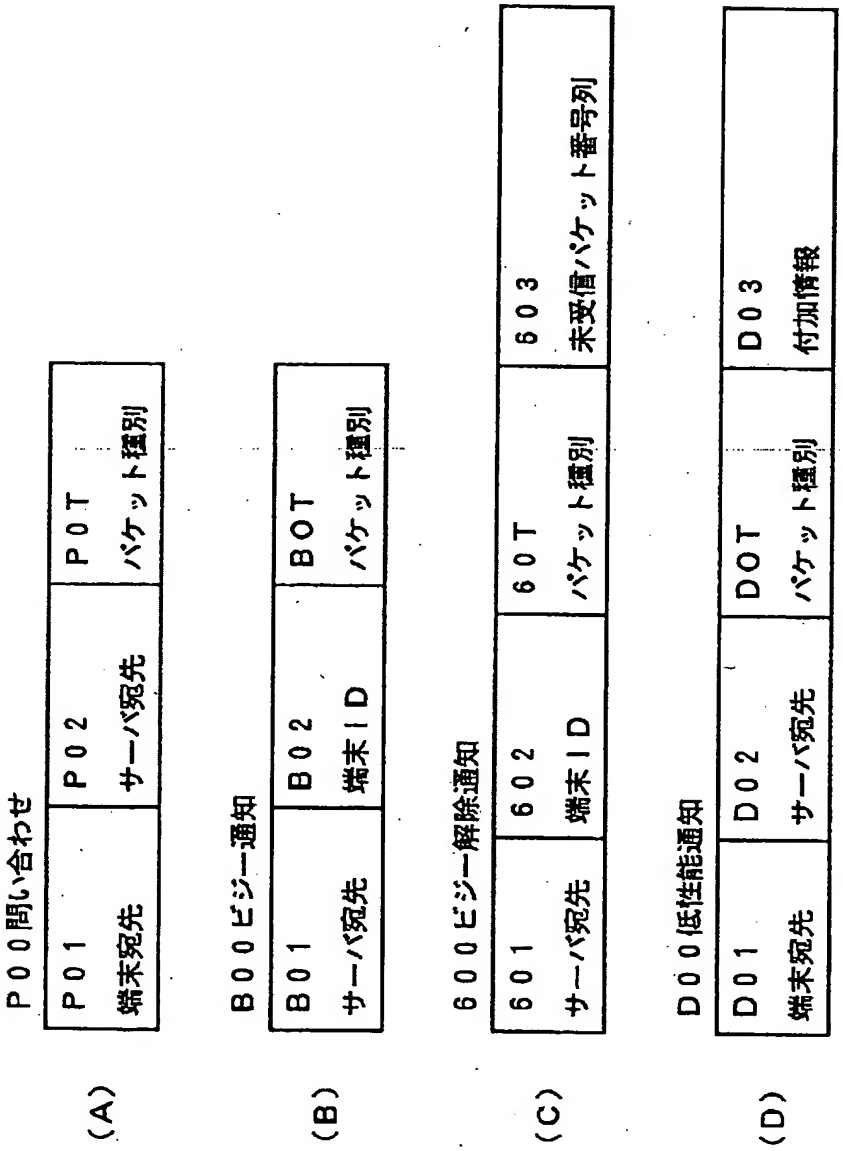
【 図5 】

本発明のサーバの構成図



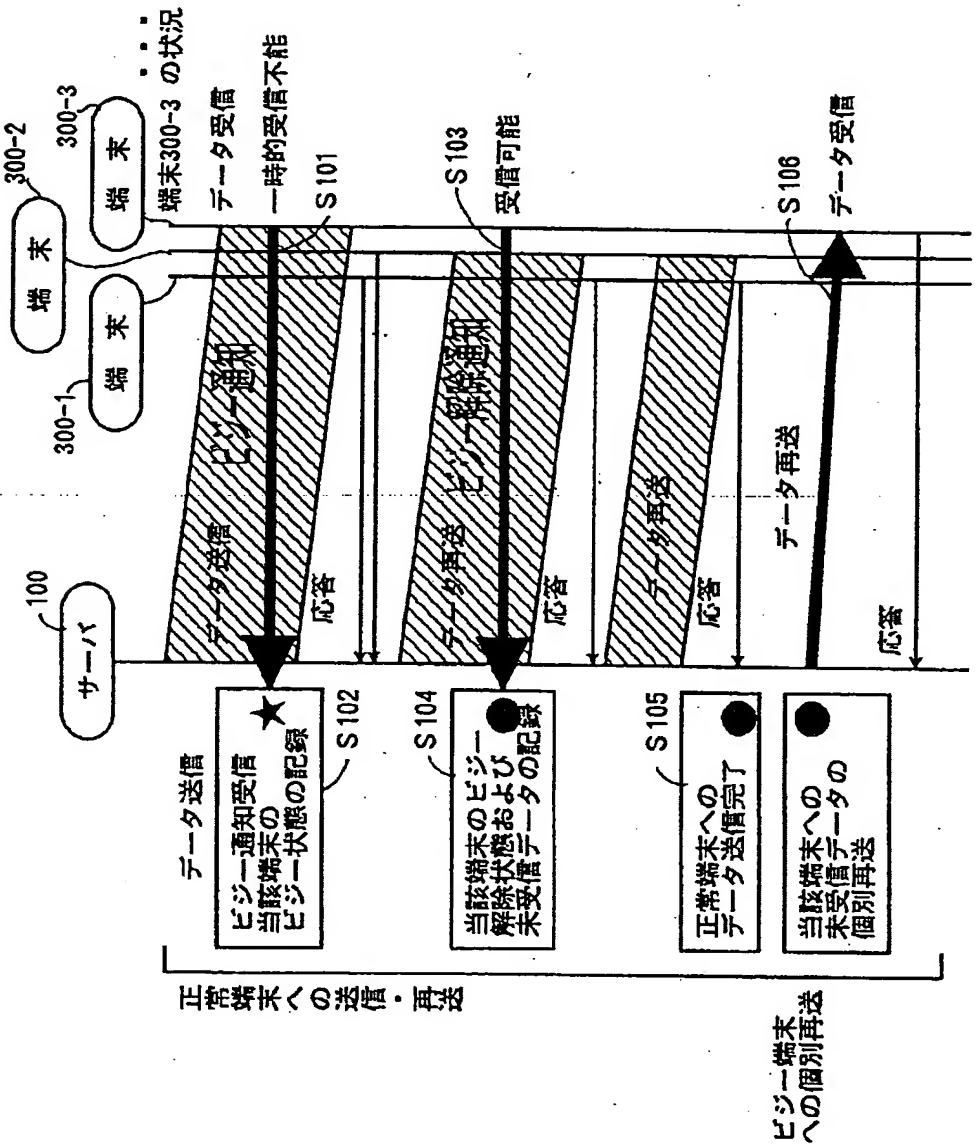
【 図7 】

本発明の通信パケットの構成例を示す図



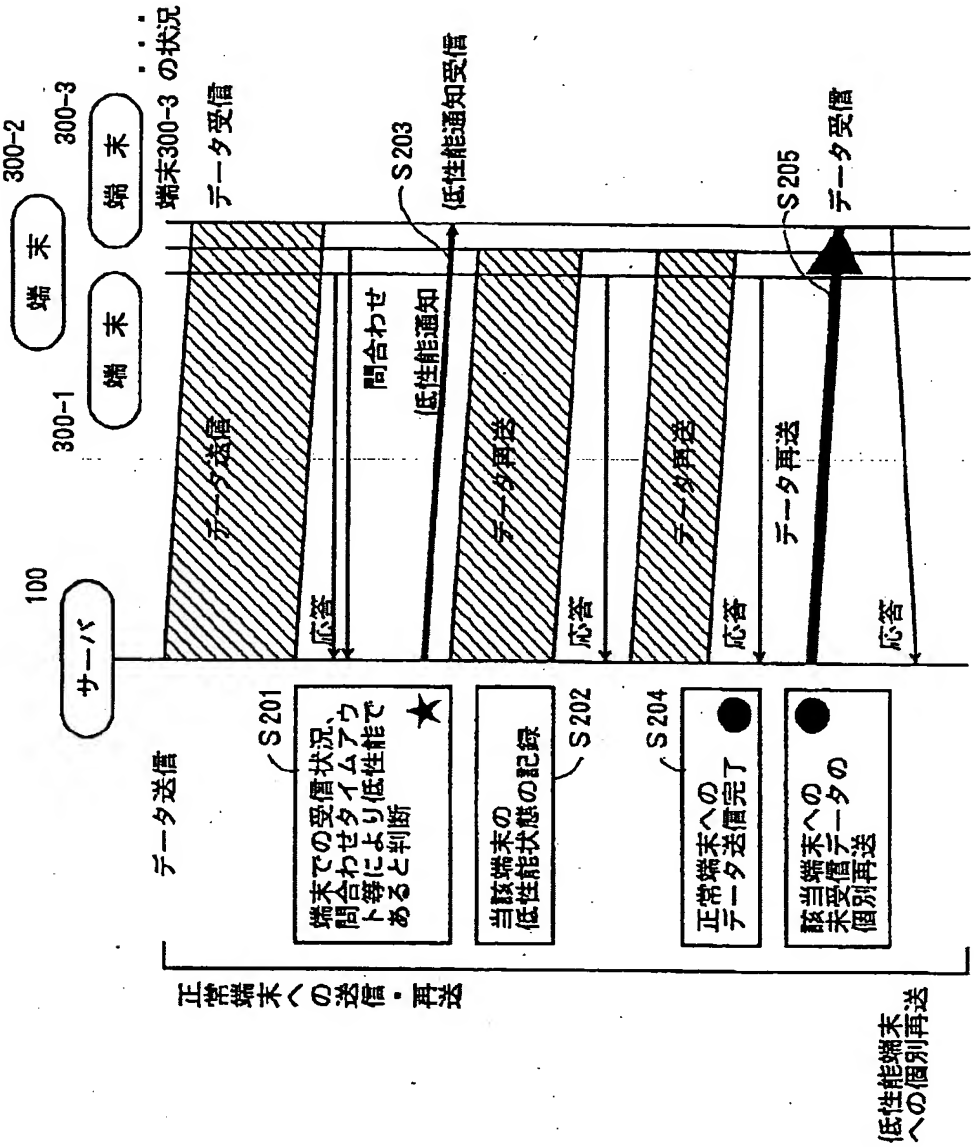
【 図8 】

本発明のビジー端末と判定された場合のデータ再送シーケンスを示す図



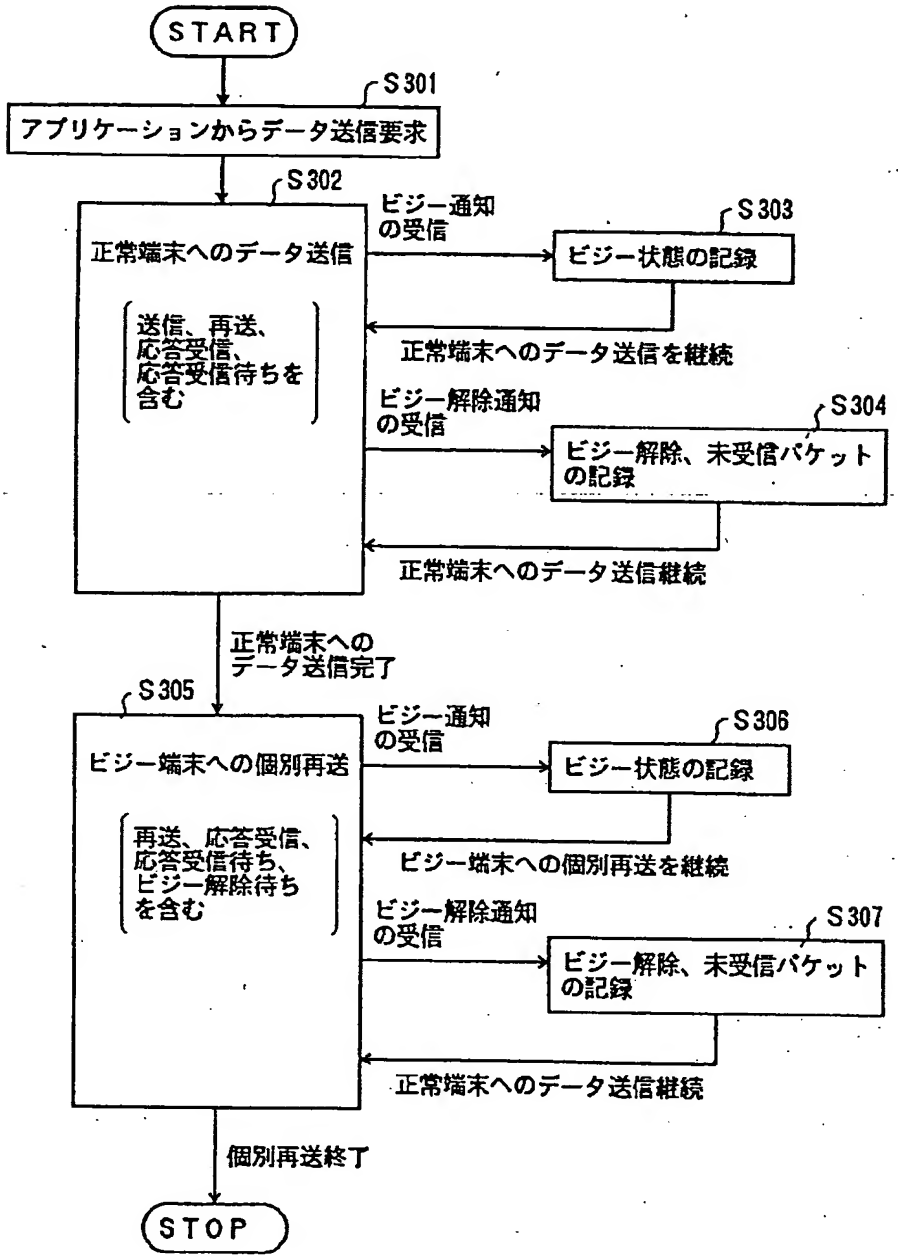
【 図9 】

本発明の低性能端末と判定された場合のデータ再送シーケンスを示す図



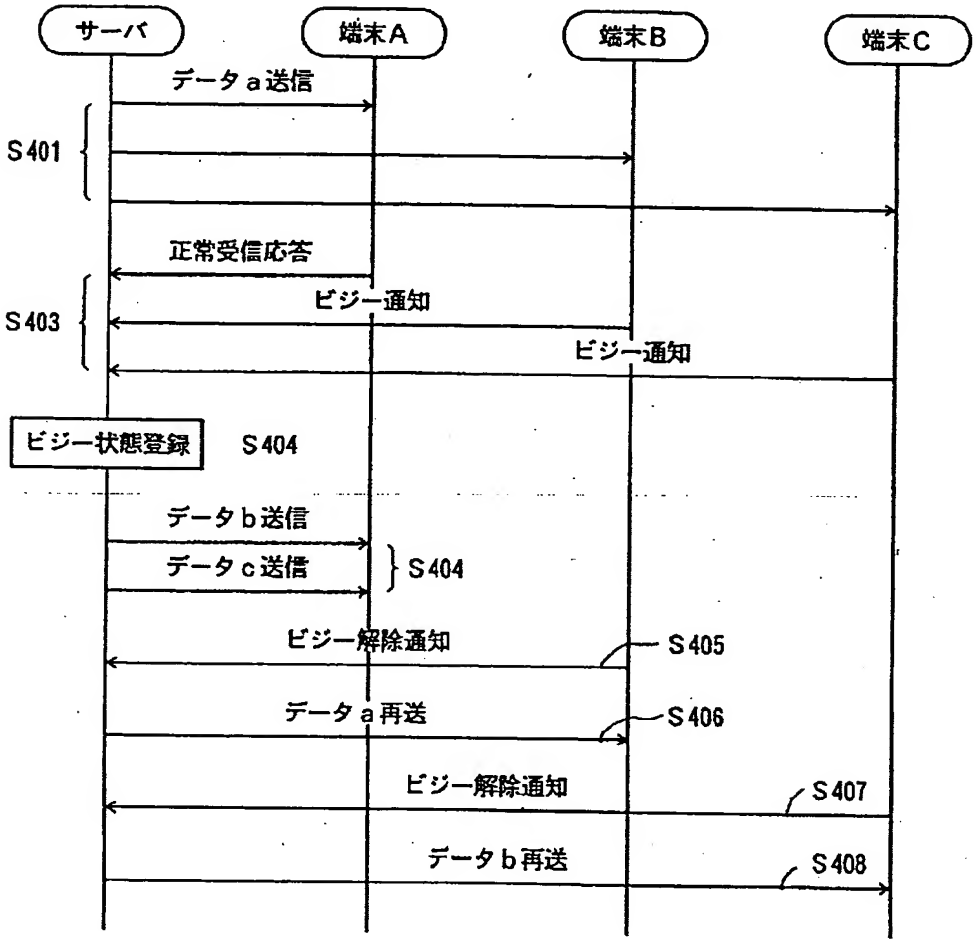
【 図10 】

本発明の一実施例のサーバからのビジー端末へのデータ再送の動作のフローチャート



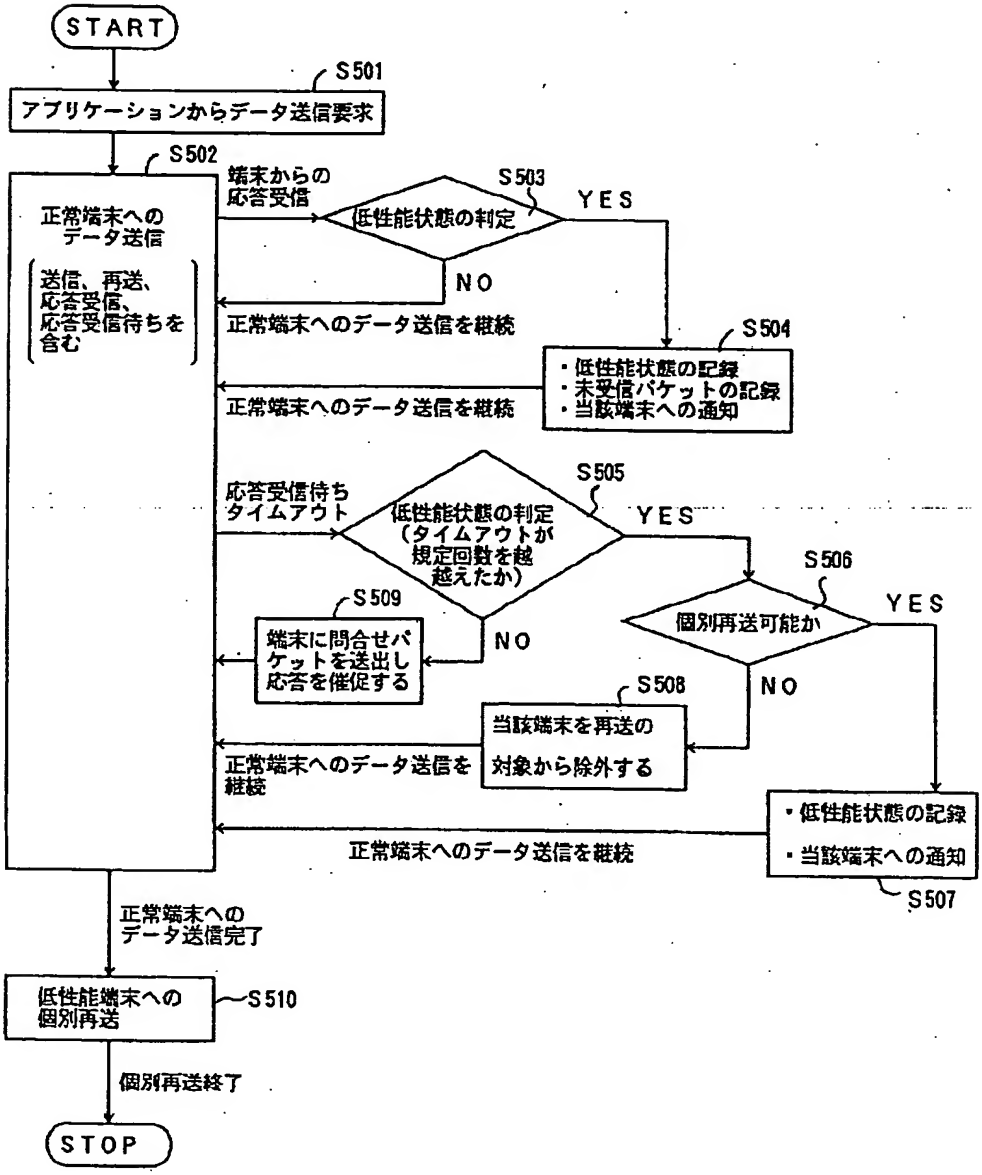
【 図11 】

本発明の一実施例のビジー端末がある場合のデータ再送の動作を示すフローチャート



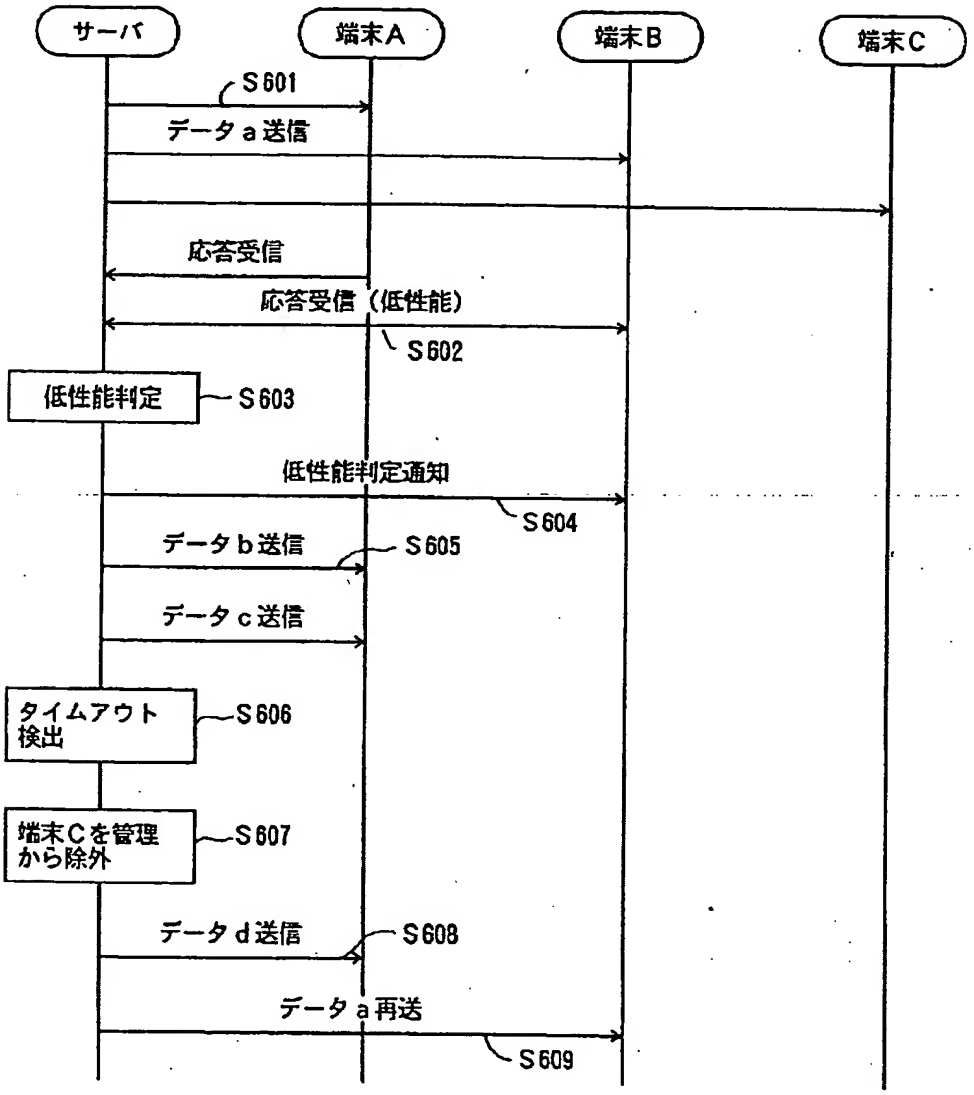
【 図12 】

本発明の一実施例のサーバから低性能端末へのデータ再送動作のフローチャート



【 図1 3 】

本発明の一実施例の低性能端末についてのデータ再送動作のシーケンスチャート



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(71)Applicant : NIPPON TELEGR & TELEPH CORP <NTT>

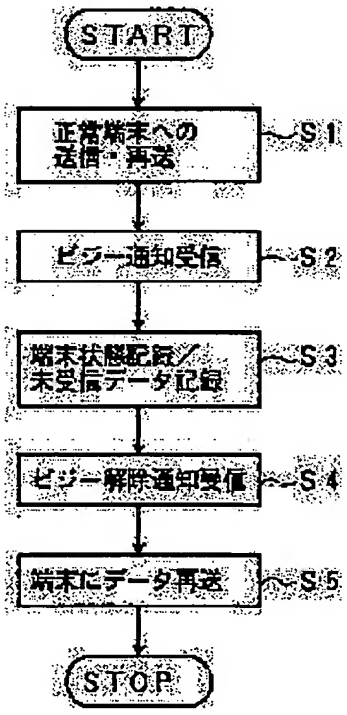
(72)Inventor : SHIROSHITA TERUJI
TAKAHASHI OSAMU
YAMASHITA MASAHIDE

(54) DATA RESENDING METHOD AND SERVER

(57)Abstract:

PROBLEM TO BE SOLVED: To improve the efficiency of data transfer to all of many terminals by making a server transmit and retransmit data preferentially to many normal terminals and resend only unreceived data to a terminal which becomes busy and a terminal with low receiving performance at server's convenient time.

SOLUTION: This server performs the data transmission and retransmission preferentially to many normal terminals (step 1) and retransmits only the unreceived data to the terminal which becomes busy and the terminal with low receiving performance at server's convenient time (step 2). Further, the server records the states of the terminals and the status of the unreceived data and performs individual state management different from the states of other normal terminals (step 3), and when a busy state reset report showing that reception is enabled is received from the terminal (step 4), the state of the terminal and the status of the unreceived data are referred to, thereby resending the data to the terminal at server's convenient time according to the record.



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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] In the data resending approach which resends data again when a server performs data transmission and this terminal cannot receive all the data to two or more terminals connected through a communication network the terminal which said server gave priority to transmission to many normal terminals, and resending, and performed data transmission, and became a busy only about non-received data when the convenience of a server was good, and a terminal with the low receiving engine performance -- resending -- the data resending approach characterized by things.
[Claim 2] Said server is the data resending approach according to claim 1 of performing another status management from the status management table A of the terminal which has received all the data normally in parallel to the state transition of said status management table A corresponding to the terminal which was not able to receive all the data normally which derived two or more status management tables, and followed advance of transmission or.
[Claim 3] When a signal to that effect is received from the terminal with which non-receipt or receiving capacity declined temporarily, said server Freeze transition of the terminal concerned in said status management table A, record this condition, and after that, when the signal of the purport which became ability ready for receiving from the terminal concerned is received The data resending approach according to claim 2 which restores the condition of the terminal concerned, and the situation of non-received data from said condition that freezing record was carried out, and resumes data transmission to the terminal concerned.
[Claim 4] When a signal to that effect is received from the terminal with which non-receipt or receiving capacity declined temporarily, said server Carry out freezing record of the state transition of the terminal concerned in said status management table A, and the status management table B is newly opened. Succeed a condition from said status management table A, perform resending control to said terminal according to said status management table B, and after that, when the signal of the purport which became ability ready for receiving from the terminal concerned is received The data resending approach according to claim 2 which resumes the state transition of said terminal on said status management table A, succeeds the situation of non-received data from the condition of said status management table B in that case, and resumes data transmission to said terminal at it.
[Claim 5] In the server which resends data again when data transmission is performed among two or more terminals connected to a communication network and this terminal cannot receive all the data said server The server characterized by having the management tool which divides transmission to a normal terminal and the status management of resending, and the status management of the terminal which published the notice of a busy, and the terminal judged that the receiving engine performance is low, and performs them, and a transmitting means to perform data transmission to a terminal based on said management tool.
[Claim 6] Said management tool is a server according to claim 5 which has a normal terminal management means to manage the condition of the normal terminal which carried out normal reception of the transmit data, and the individual management tool which manages a busy condition, a busy discharge condition, and a low engine-performance condition according to an individual as a condition of said terminal, respectively.
[Claim 7] Said management tool is a server according to claim 5 which has further a status management shift means to shift management to said individual management tool when the terminal managed with said normal terminal management means changes from an all seems well to an abnormal condition, and to shift to a normal terminal management means when the terminal managed with said individual management tool changes to an all seems well.

[Claim 8] Said individual management tool is a server according to claim 6 which has a terminal status management means to manage a busy thing and to manage that data resending is possible when the notice of busy discharge is received when the notice of a busy was received from the terminal and said notice of a busy is thought to be the resending management tool which memorizes reception and un-receiving from said terminal. [of the packet in a terminal]
[Claim 9] The 1st low engine-performance judging means which judges whether this terminal is the low engine performance when said individual management tool has a negative acknowledge to said transmit data from said terminal, The 2nd low engine-performance judging means judged from said terminal to be a low engine-performance terminal when there is no response to said transmit data, and there is no response exceeding the time-out of a predetermined count, The server according to claim 6 which has an exclusion means to except the terminal judged to be the low engine performance from said normal terminal management means in said 1st low engine-performance judging means or said 2nd low engine-performance judging means.
[Claim 10] It is the server according to claim 5 which resends data to the terminal judged that said transmitting means can be transmitted individual among the terminal of the issue origin of the notice of a busy which is made to give priority to data transmission to said normal terminal managed in said normal terminal management means, and is managed by said individual management tool subsequently to [after completing transmission to said normal terminal], or said low engine-performance terminal.
[Claim 11] The server according to claim 8 which contains a non-received packet number in said notice of busy discharge.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the data resending approach and a server, and especially, when a server performs data transmission by a multicast (destination assignment multiple address) etc. to two or more terminals and there are loss and the error of received data, it relates to the data resending approach and server which resend to a terminal from a server.
[0002]
[Description of the Prior Art] In the data communication to which a server generally transmits data to two or more terminals After the server of a transmitting side divides a series of data into the data (it is hereafter called a packet) of suitable magnitude and transmits to two or more terminals, each terminal Returning to a server by making information about acknowledge of normal reception, or non-received data into a negative acknowledge, a server resends a packet to two or more terminals based on these responses again.
[0003] Drawing 14 is drawing showing the data resending sequence to conventional two or more terminals. After a server carries out data transmission to two or more terminals, a response is returned from each terminal, a server generates resending data based on these responses, and having repeated the procedure of performing data resending is shown.
[0004] In this drawing, data transmission is performed from a server to three terminals of terminals 1, 2, and 3. Thereby, the purport of normal reception or abnormality reception is answered from a terminal. Here, since it is only a terminal 1, it resends data to terminals 2 and 3 that there was a normal response as a result of a server's carrying out data transmission at terminals 1, 2, and 3. Here, although there was a response of the purport of normal reception from a terminal 2, since it is the abnormality response from a terminal 3, again, a server generates resending data and resends data for the data concerned to a terminal 3.
[0005] Moreover, in the conventional description, temporarily, with it being non-receipt (busy), when the notice of a busy is transmitted, interruption of data transmission to the busy terminal concerned is required from a server, when it becomes, and the terminal concerned becomes ability ready for receiving, the data resending method with which a terminal transmits the notice of busy discharge has a terminal. Drawing 15 shows the data resending sequence by the conventional notice of a busy. If a server receives the notice of a busy from the terminal (busy terminal) which became non-receipt temporarily during data transmission, data transmission to the terminal concerned is interrupted, and after receiving the notice of busy discharge from the terminal concerned, the procedure which resumes data transmission is shown.
[0006] In this drawing, when a server transmits data to a terminal, since the terminal is busy, it is the example which is in a non-receipt condition temporarily. In this case, since the notice of a busy is published from a terminal even if it transmits data from a server, a server will interrupt data transmission, if this notice of a busy is received. Furthermore, if a terminal changes in the ready-for-receiving ability condition, the notice of busy discharge will be transmitted to a server. Thereby, a server resumes transmission of data to a terminal.
[0007]
[Problem(s) to be Solved by the Invention] However, when the notice of a busy is received from the terminal which has a server when using combining the two above-mentioned conventional methods, if status management is

performed to other normal terminals and EQCs, since data transmission to the normal terminal which are not other busies, and resending will also interrupt this terminal, a server has the problem that the effectiveness of the whole data communication falls remarkably.
[0008] Moreover, in the same situation, if the communication link to the terminal concerned is removed from status management, it is necessary to redo resending to the terminal concerned from the beginning also including data [finishing / reception], and the communication link effectiveness to the terminal concerned will fall remarkably. Moreover, in the method of the former of the above-mentioned conventional technique, there is a problem that the data communication effectiveness to the whole terminal falls as it will be dragged by the receiving engine performance of this terminal and the count of resending will increase, if the terminal which is not good as for a data receiving situation is treated to many of other normal terminals and EQCs.
[0009] Moreover, in the same situation, if the communication link to the terminal concerned is removed from status management, it is necessary to redo resending to the terminal concerned from the beginning also including data [finishing / reception], and the communication link effectiveness to the terminal concerned will fall remarkably. Especially the above problem manifests itself, when a server performs data resending in the multicast communication link which performs the multiple address to two or more terminals by the transmitting processing which is 1 time.
[0010] When the convenience of a server is good, resending to the terminal which this invention was made in view of the above-mentioned trouble, and gave priority to transmission to many normal terminals, and resending, and became a busy, or a terminal with the low receiving engine performance It aims at offering the data resending approach and server which priority is given to transmission to many normal terminals, and can perform it, making it possible to resend only non-received data to the terminal concerned, and mitigating the resending data to the terminal concerned, without resending data [finishing / reception].
[0011]
[Means for Solving the Problem] In the data resending approach that this invention resends data again when a server performs data transmission to two or more terminals connected through a communication network and this terminal cannot receive all the data A server gives priority to transmission to many normal terminals, and resending, performs data transmission (step 1), and when the convenience of a server is good, it resends only non-received data to the terminal used as a busy, or a terminal with the low receiving engine performance (step 2).
[0012] moreover, one or more individuals [condition / of a normal terminal] in case this invention performs status management of each terminal in a server -- something unusual -- voice management -- being derived -- the status management of a normal terminal -- being parallel -- an individual -- something unusual -- voice management is also performed. Drawing 1 is drawing for explaining the principle of this invention.
[0013] When the notice of a busy is received from the terminal which became non-receipt temporarily in this invention, a server (Step 2), Record the condition of a terminal, record the condition of a terminal, and the situation of non-received data, and it considers as individual status management with the another condition of other normal terminals (step 3). When the notice of busy discharge which shows that it became ability ready for receiving from the terminal is received, when the convenience of a server is good, with reference to the condition of (step 4) and a terminal, and the situation of non-received data, the data to a terminal are resent based on this record (step 5).
[0014] Moreover, in this invention, when the receiving situation of a terminal is not good, a server makes this terminal individual status management different from the condition of other normal terminals, records the condition of the terminal concerned, and the situation of non-received data, and when convenience of a server is good, it resends the data to the terminal concerned based on record.
[0015] Drawing 2 is the principle block diagram of this invention. In the server 100 which resends data again when this invention performs data transmission among two or more terminals connected to a communication network and this terminal cannot receive all the data A server 100 has the management tool 10 which divides transmission to a normal terminal and the status management of resending, and the status management of the terminal which published the notice of a busy, and the terminal judged that the receiving engine performance is low, and performs them, and a transmitting means 30 to perform data transmission to a terminal based on a management tool 10.
[0016] The above-mentioned management tool 10 has a normal terminal management means 40 to manage the condition of the normal terminal which carried out normal reception of the transmit data, and the individual management tool 20 which manages a busy condition, a busy discharge condition, and a low engine-performance

condition according to an individual, respectively. The above-mentioned management tool 10 shifts management to the individual management tool 20, when the terminal managed with the normal terminal management means 40 changes from an all seems well to an abnormal condition, and when the terminal managed with the individual management tool 20 changes to an all seems well, it has further a status management shift means to shift to the normal terminal management means 40. The above-mentioned individual management tool 20 has the resending management tool 21 which will memorize reception and un-receiving if the notice of a busy is received from a terminal, and a terminal status management means 22 to manage ** in which data resending is possible if it manages that it is busy if the notice of a busy is received from a terminal and the notice of busy discharge is received. [of the packet in a terminal]

[0017] The 1st low engine-performance judging means 23 which judges whether this terminal is the low engine performance when the above-mentioned individual management tool 20 has a negative acknowledge to transmit data from a terminal, The 2nd low engine-performance judging means 24 judged from a terminal to be a low engine-performance terminal when there is no response to transmit data, and there is no response exceeding the time-out of a predetermined count, In the 1st low engine-performance judging means 23 or the 2nd low engine-performance judging means 24, it has an exclusion means 25 to except the terminal judged to be the low engine performance from the normal terminal management means 40.

[0018] Data are resent to the terminal judged that the above-mentioned transmitting means 30 can be transmitted individual among the terminal of the issue origin of the notice of a busy which is made to give priority to data transmission to the normal terminal managed in the normal terminal management means 40, and is managed by the individual management tool 20 subsequently to [after completing transmission to a normal terminal], or a low engine-performance terminal.

[0019] Moreover, the identifier of a non-received packet is included in the notice of busy discharge. It is solved by performing status management apart from a normal terminal by the above to the terminal judged that the terminal and the receiving engine performance which the notice of a busy was received apart from transmission to a normal terminal and the status management of resending in the server 2 are low. Specifically, it is as follows.

[0020] In a server 100, even after judging it after the notice reception of a busy, and as the low engine performance with the time of a terminal status management means 22 to memorize the conditions (a busy condition, a busy discharge condition, a low engine-performance condition, normal state, etc.) of a terminal, and a normal state, the resending management tool 21 which memorizes reception / un-receiving is formed. [of each packet in the terminal concerned]

[0021] Moreover, 1st and 2nd low engine-performance judging means 23 and 24 to set 100 to a server and to judge that a terminal is in a low engine-performance condition is established. When the notice of a busy is received from a terminal, a server 100 records that the terminal concerned became a busy on the terminal status management means 22, and holds record of reception / non-receive state of each packet as it is in the resending management tool 21. (The latest receiving situation of the terminal concerned is recorded by the negative acknowledge.) When there is no negative acknowledge, not all packets have received. Thereby, the condition and packet receiving situation of a busy terminal are manageable in distinction from a normal terminal henceforth.

[0022] A server 100 excepts the terminal concerned from a normal terminal, and continues transmission to other terminals, and resending. If a busy terminal takes out the notice of busy discharge to a server when it becomes ability ready for receiving, and a server receives the notice of busy discharge, it will record that busy discharge of the terminal was carried out in the terminal status management means 22. Including the number of a non-receive packet in the notice of busy discharge, the server breaks and holds record of reception / non-receive state of the packet of a resending management tool.

[0023] A server performs data resending to the busy discharge terminal by which busy discharge is carried out with reference to the terminal status management means 22 after transmission to a normal terminal, and resending termination when self convenience is good. About the busy terminal by which busy discharge is not carried out, a server is resent, after waiting until the notice of busy discharge comes. Although waited predetermined time by the timer supervision about the notice waiting of busy discharge in this server, a communication link is closed about the terminal which carried out the time-out.

[0024] In the 1st and 2nd low engine-performance judging means 23 and 24, a server judges the terminal concerned

based on the situation of the negative acknowledge from a terminal, and not answering to be a low engine-performance condition, and records that the terminal concerned became the low engine performance on the terminal status management means 22, and holds record of reception / non-receive state of each packet as it is in the resending management tool 21. (The latest receiving situation of the terminal concerned is recorded by the negative acknowledge.) When there is no negative acknowledge, not all packets have received. Thereby, the condition and packet receiving situation of a low engine-performance terminal are manageable in distinction from a normal terminal henceforth.

[0025] It does not wait vague long time, but especially that of a non-answered time-out is judged with the low engine performance, when it presses for a response, count permission of a convention of the time-out is carried out and this count is exceeded by the inquiry packet. Since it can judge with the low engine performance clearly by this, it judges for a short time rather than it stands by vaguely, and it can change to transmission (it is multicast resending in the case of a multicast) to the normal terminal of the next round, efficient data resending can be performed.

[0026] A server performs data resending to a low engine-performance terminal after transmission to a normal terminal, and termination of resending, when self convenience is good. As for to any priority shall be given between resending to a busy terminal, and resending to a low engine-performance terminal, plans may differ for every system. It is efficient when resending to a low engine-performance terminal is performed at the idle time of the waiting for busy discharge.

[0027] By the above, a server gives priority to data transmission to a normal terminal, and resending, and it can resend only non-received data, without resending data [finishing / reception] also to a busy terminal and a low engine-performance terminal. Consequently, it is not necessary to redo resending to a busy terminal and a low engine-performance terminal from the beginning, and the effectiveness of the whole data communication can be raised, without interrupting data transmission to a normal terminal, and resending, or carrying out performance degradation.

[0028]

[Embodiment of the Invention] Hereafter, the example of this invention is explained using a drawing. Drawing 3 shows the information communication link system configuration which applied this invention. The system shown in this drawing consists of a server 100, a communication network 200, and two or more terminals 300. The system of this drawing shows signs that the negative acknowledge which includes the acknowledge or resending information on the confirmation of receipt from each terminal 300 is returned, after a server 100 transmits data to two or more terminals 300.

[0029] Drawing 4 shows the outline of actuation of this invention. In the server, signs that the status management according to individual is derived are shown from the status management of a normal terminal. This drawing shows the system which performs data transmission from a server 100 to four terminals 300-1,300-2,300-3,300-4.

[0030] To the beginning, the individual status management of the terminal 300 concerned is started by the specific event in a server 100. In parallel with management of a normal terminal, one or more individual status management is performed. For example, in drawing 4 , when a server 100 receives the notice of a busy, status management is begun by using the terminal 300-3 concerned as a busy terminal. When a server 100 judges with the low engine performance, the status management as a low engine-performance terminal of the terminal 300-4 concerned starts. In any case, the status management of other normal terminals 300-1,300-2 continues.

[0031] In drawing 4 , if a server 100 performs data transmission to a terminal 300-1,300-2,300-3,300-4, from a terminal 300-1,300-2, a normal notice (notice of the completion of data reception) will be received, and the notice of a busy will be received from a terminal 300-3. At this time, individual status management is performed as a busy terminal to a terminal 300-3. Furthermore, about a terminal 300-4, since individual status management was started since the notice of abnormalities arrived, and the time-out was repeated more than the count of predetermined, it shall judge with the low engine performance and individual status management shall be performed.

[0032] Drawing 5 shows the configuration of the server of this invention. The server 100 shown in this drawing consists of the resending control section 101, the communications control section 102, the application Management Department 103, the resending Management Department 104, the data configuration section 105, the terminal status management section 106, and the terminal engine-performance judging section 107.

[0033] The resending control section 101 performs data communication through the communications control section 102 based on the data Request to Send from the application Management Department 103. Transmit data is constituted

in the data configuration section 105. At the resending Management Department 104, the packet receiving situation (received/distinction which is not received for every terminal of each packet to which the sequence number was attached) of all the terminals 300 is managed on the resending managed table 1041 shown in drawing 6 . The receiving situation of a busy terminal is also memorized by this. The resending managed table 1041 can show whether the packet corresponding to a packet number is reception ending (O), or it has not received (x) in each terminal, as shown in drawing 6 . A mounting top is realizable when it makes bit-off (0) corresponding to [x] corresponding to O for bit-on (1).

[0034] The resending managed table 1041 is used for management of the receiving situation (success or failure of packet reception) of the packet of each terminal for packet resending. The resending managed table 1041 can be shared at a normal terminal and a busy terminal, and a low engine-performance terminal. However, from a viewpoint of processing effectiveness, when the individual status management of a busy terminal or a low engine-performance terminal starts, the line of the table about the terminal concerned can be copied, another table (only line) can be prepared for every terminal, and thereby, the resending situation of each terminal can also be managed. In this case, when individual resending of each terminal (a busy terminal, low engine-performance terminal) is completed, in the original resending managed table, the completion situation of data resending of the whole terminal can be grasped by reporting a result to the original resending managed table.

[0035] In the terminal status management section 106, it manages and memorizes whether it is in which conditions, such as a normal communication link condition, a busy condition, a busy discharge condition, and a low engine-performance condition, for every terminal. This analyzes the contents of the response frame from a terminal 300 through a communication network 200, and recognizes a condition.

[0036] The contents of the communication link frame are shown in drawing 7 . This drawing (A) is the frame of the inquiry which transmits from a server 100 to a terminal 300, and is constituted in the terminal destination P01, the server destination P02, and packet classification P0T. The server destination P02 sets up the address of the server of the dispatch origin at the time of an inquiry. Packet classification P0T distinguish the packet classification of the data of an inquiry by the integral value.

[0037] This drawing (B) shows the notice of a busy transmitted from a terminal 300 to a server 100, and consists of the server destination B01, a terminal ID 02, and packet classification B0T. Packet section classification B0T set up the classification of the notice of a busy by the integral value. This drawing (C) shows the notice of busy discharge transmitted from a terminal 300 to a server 100, and consists of the server destination 601, a terminal ID 602, packet classification 60T, and a non-receive-packet number train 603. Packet classification 60T set up the integral value which shows the classification of the notice of busy discharge here.

[0038] This drawing (D) shows the notice of the low engine performance transmitted from a center 100 to a terminal 300, and includes the server destination 601, a terminal ID 602, and the number train 602 of the non-receive packet in the notice sending-out time of busy discharge in each terminal. The number train of a non-receive packet is usually equivalent to the non-receive-packet number train included in a negative acknowledge from a terminal, and includes the numerical train, the suitable range notation, etc. Packet classification D0T set up the integral value which shows the classification of the notice of the low engine performance. Additional information D03 is additional information, such as a stage of individual resending, and the reception preparation of it is beforehand attained by knowing about what time data resending will be resumed in a terminal.

[0039] The terminal engine-performance judging section 107 judges whether based on the response from a terminal 300, the terminal concerned changed into the low engine-performance condition. Based on the situation of the time-out which is not answered [a negative acknowledge or], the terminal concerned is judged from a terminal to be a low engine-performance terminal, and the judgment result is notified to the terminal status management section 106. In addition, a non-answered time-out is judged with the low engine performance, when it presses for a response by the inquiry packet and a time-out exceeds the count of a convention.

[0040] Drawing 8 shows the resending sequence at the time of being judged with the busy terminal of this invention. In this drawing, when data are transmitted from a center 100, a terminal 300-3 shall be in a busy condition, and a terminal 300-1,300-2 presupposes that it is an all seems well. The terminal 300-3 concerned records that the server 100 would be in the busy condition for a server 100 to receive the notice of a busy from a terminal 300-3 during data transmission on the terminal status management section 106 (step 102). (step 101) A server 100 manages the condition

of a terminal 300-3 apart from a normal terminal after this. As for a server, after record of a busy terminal continues the communication link of transmission to a normal terminal, resending, response reception, etc.
[0041] next, a terminal 300-3 to the notice of busy discharge -- receiving (step 103) -- as for a server 100, a terminal 300-3 records having changed into the busy discharge condition on the terminal status management section (step 104). The non-receive-packet number train included in the notice of busy discharge at coincidence is recorded on the resending managed table 1041 of the resending Management Department 104. As for a server 100, after record of busy discharge continues the communication link with the normal terminal 300-1,300-2 (step 105).
[0042] A server 100 resends non-received data to the terminal 300-3 of which the busy is canceled after completing the communication link to the normal terminal 300-1,300-2 (step 106). Drawing 9 shows the resending sequence at the time of being judged with the low engine-performance terminal of this invention. In this drawing, since a reception response is not carried out from a terminal 300-3 when data are transmitted from a center 100, a center 100 explains the case where it judges with it being the low engine performance by a time-out etc.
[0043] The terminal 300-3 concerned records that the server 100 changed into the low engine-performance condition for a server 100 to judge a terminal 300-3 during response reception to be a low engine-performance terminal on the terminal status management section 106 (step 202). (step 201) The non-receive-packet number train included in the negative acknowledge from the terminal 300-3 at coincidence is recorded on the resending managed table 1041 of the resending Management Department 104. (When there is also no negative acknowledge, all packet un-receiving are recorded.) A server 100 is in a low engine-performance condition to the terminal 300-3 concerned, and it tells that data transfer was interrupted as a notice of the low engine performance again (step 203). A server 100 manages the condition of a terminal 300-3 apart from a normal terminal after this. As for a server, after record of a low engine-performance terminal continues the communication link of transmission to a normal terminal, resending, response reception, etc.
[0044] A server 100 resends non-received data to a terminal 300-3 after completing the communication link to a normal terminal (step 204) (step 205).
[0045]
[Example] Below, the example of this invention is explained with a drawing. Drawing 10 is the example of the data resending procedure (flow chart) in the server which applied this invention. It is an example concerning the treatment of a busy terminal to the beginning.
[0046] Step 301 The resending control section 101 will initialize the terminal status management section 106 and the resending Management Department 104 to the data transmission concerned, if a data Request to Send is received from application 0 **** 103.
Step 302 The data configuration section 105 constitutes the first transmit data, carries out packet division and transmits it to the communications control section 102. The communications control section 102 starts transmission to a normal terminal for the transmit data by which packet division was carried out. Henceforth, the step concerned is processed until data transmission (transmission, resending, response reception, and response receiving waiting are included) to a normal terminal is completed.
[0047] Step 303 If the notice of a busy is received from a terminal 300 in the meantime, the terminal status management section 106 will record the busy condition of the terminal concerned, and will manage a busy terminal apart from the condition of a normal terminal. Immediately, it returns to processing of the data transmission to a normal state.
Step 304 Further, a server 100 records the situation of the non-receive packet of a terminal on the resending Management Department 104 based on the number of the non-receive packet of the notice of busy discharge while recording busy discharge on the terminal status management section 106, if the notice of busy discharge is received.
[0048] It is also possible to receive the notice of a busy from the terminal which published the notice of busy discharge once again, and the condition of a terminal is again recorded as a busy condition in the step concerned in this case. When all data transmission to a normal terminal is completed, it moves to the processing step 305 of individual resending to a busy terminal.
[0049] Step 305 A server 100 resends a non-receive packet with reference to the resending managed table 1041 to the busy terminal which has received the notice of busy discharge at step 304. During individual resending to a busy terminal, it is possible to receive the notice of a busy from a terminal [finishing / busy discharge] including the

terminal under resending, and the condition of the terminal concerned is recorded as a busy condition at step 306.
[0050] Step 306 It is possible to receive the notice of busy discharge from the terminal of a busy condition during individual resending of a busy terminal.
Step 307 When the notice of busy discharge is notified from a terminal, while recording busy discharge, based on the number of the non-receive packet of the notice of busy discharge, the situation of the non-receive packet of a terminal is recorded on the resending Management Department 104.
[0051] When discriminating resending to a busy terminal is completed, all data transmission is ended. In addition, on mounting, when there are two or more busy terminals, although every one resending processing to a terminal can be performed, resending to two or more busy terminals can also be performed to juxtaposition. Drawing 11 is a sequence chart which shows actuation of data resending in case there is a busy terminal of one example of this invention. .
[0052] Step 401 First, if the data for transmission are passed to the resending control section 101 from the application Management Department 103 of a server, by the resending control section 101, initial setting will be performed for the resending Management Department 104 and the terminal status management section 107. If transmit data is acquired, the data configuration section 105 will carry out packet division of the data concerned, will give the address of a destination terminal, and will transmit Data a to Terminal A, Terminal B, and Terminal C through the communications control section 102.
[0053] Step 402 Here, to transmit data a (packet number "1"), a server 100 has the response of normal reception from Terminal A, and receives the notice of a busy from Terminal B and Terminal C.
Step 403 The terminal status management section 106 will record that Terminals A and B are in a busy condition, if the purport that Terminal B and Terminal C concerned are busy is received through the resending control section 106. Furthermore, if the resending Management Department 104 is notified of the condition of Terminals B and C, "x" which shows un-receiving will be recorded on the column of the data a of the terminals B and C of the resending managed table 1041. If the resending Management Department 104 is notified of the condition of Terminal A, "O" will be recorded on the resending Management Department table 1041.
[0054] Furthermore, when the server 100 received Terminal B and the notice of C busy, it records that the terminals B and C concerned are in a busy condition on the terminal status management section 106.
Step 404 In the above-mentioned step 402, when normal reception of the data transmission is being continued and carried out to the normal terminal A which is carrying out normal reception, this processing is repeated.
[0055] Step 405 A server 100 receives the notice of terminal B busy discharge in a busy condition.
Step 406 With reference to the resending managed table 1041 of the resending Management Department 104, a server 100 recognizes the packet (the packet which has given x to the resending managed table: here, consider as Data a) which is not transmitted to the terminal B concerned, acquires the data a concerned, and resends Data a to the terminal B1" concerned after transmitting termination of the normal terminal A.
[0056] Step 407 The notice of terminal C busy discharge is received further here.
Step 408 A server 100 is the same approach as the above-mentioned step 405, and resends Data a. Thus, in resending data, the condition of data reception of a terminal or not receiving is managed in the resending managed table 1041 of the resending Management Department 104, and it determines the necessity of resending with reference to the table 1041 concerned. Moreover, management with a busy terminal is performed in the terminal status management section 106, for example, when a terminal 300 is busy, it is referred to as bit =1, and it will be referred to as bit =0 if the notice of busy discharge is received from a terminal 300. If this notice of busy discharge is received, since data resending will be attained, with reference to the resending managed table 1041, timing with the sufficient convenience of a server 100 is chosen, and data are resent to the terminal 300 concerned.
[0057] Next, the example which resends data to the terminal judged to be the low engine performance is explained. Drawing 12 is the flow chart of the data resending actuation to a low engine-performance terminal from the server of one example of this invention.
step 501 the resending control section 101 -- an application -- if a data Request to Send is received from the KESHI Management Department 103, the terminal status management section 106 and the resending Management Department 104 will be initialized.
[0058] Step 502 The data configuration section 105 constitutes the first transmit data, carries out packet division and transmits it to the communications control section 102. The communications control section 102 starts transmission to

a normal terminal for the transmit data by which packet division was carried out. Henceforth, the step concerned is processed until data transmission (transmission, resending, response reception, and response receiving waiting are included) to a normal terminal is completed.
[0059] Step 503 The terminal engine-performance judging section 107 acquires the negative acknowledge concerned from the resending control section 101, and a server 100 judges the condition of the terminal 300 of response transmitting origin, when the response from the terminal 300 over data transmission is stood by and a negative acknowledge occurs from a terminal 300.
[0060] Step 504 When the terminal which published the negative acknowledge is judged in the terminal engine-performance judging section 107 to be a low engine-performance terminal, the terminal status management section 106 records the purport whose terminal concerned is a low engine-performance terminal. Furthermore, through the communications control section 102, the purport used as low engine-performance treatment is notified to the terminal concerned, and it tells that resending became deferment to it.
[0061] Step 505 When n times of time-outs are set up and the count of a time-out exceeds n times again about the terminal 300 which transmitted data, it judges with the low engine performance. Here, when judged with the low engine performance, it shifts to step 506 and shifts to step 509 except it.
[0062] Step 506 About the terminal 300 used as a time-out, it judges whether individual resending is possible. The resending Management Department 104 will shift to step 508, if the terminal concerned completely comes to have received the packet with reference to the resending managed table 1041, and if at least one packet is received (at least one O is in a packet number in a resending managed table), it will shift to step 507 as individual resending being possible.
[0063] Step 507 In step 506, when judged with individual resending being possible, with reference to the resending managed table 1041, it records carrying out individual resending for a low engine-performance condition, notifies having become the terminal concerned with individual resending treatment by the notice packet, and prepares for individual resending.
[0064] Step 508 In step 506, when the terminal concerned has not received the packet at all, even if it resends more than it, it judges with that ineffective, and the terminal concerned is excepted from the object of resending.
Step 509 If it is less than a regular timeout count in step 505, it will ask a non-answered terminal (there may be more than one), a packet will be sent out, and it will press for a response, and will become the waiting for a response.
[0065] Step 510 When data transmission to a normal terminal is completed, individual resending to a low engine-performance terminal is performed. Actuation in case the above-mentioned low engine-performance terminal exists is explained. Drawing 1313 is the sequence chart of the data resending actuation about the low engine-performance terminal of one example of this invention.
[0066] Step 601 Data a are transmitted to Terminal A, Terminal B, and Terminal C from a server 100, respectively.
Step 602 A response is received from Terminal A and Terminal B. Although the response from Terminal A was a response which shows normal reception among these responses, suppose that it is the response from Terminal B a negative acknowledge. Thereby, the terminal status management section 106 makes Terminal A normal terminal management.
[0067] Step 603 A server 100 judges, in this example, judges whether in the terminal engine-performance judging section 107, the negative acknowledge concerned shows the low engine performance about the response of Terminal B to be the low engine performance, and excepts it from normal terminal management. Therefore, in the terminal status management section 106, Terminal B is considered as individual management as an abnormality terminal.
[0068] Step 604 The data configuration section 105 sets it as Terminal B that data resending to the terminal concerned became deferment as additional information in the packet of drawing 8 (D), and transmits to Terminal B.
Step 605 A server 100 sends out Data b and c to the terminal A which is a normal terminal in the meantime.
[0069] Step 606 The server 100 was supervising the time-out of Terminal C, and detected the time-out at this time.
Step 607 Since the count of this time-out is over the predetermined count n, the terminal engine-performance judging section 107 judges with it being unreceivable even if it resends data to the terminal C concerned, and is excepted from management of the terminal status management section 106.
[0070] Step 608 A server 100 transmits Data d to the normal terminal A.
Step 609 A server 100 resends Data a to Terminal B. In this example, when all individual resendings to a low engine-

performance terminal are completed, data transmitting processing is completed.
[0071] In addition, on mounting, when there are two or more low engine-performance terminals, although every one resending processing to a terminal can be performed, resending to two or more low engine-performance terminals can also be performed to juxtaposition. As mentioned above, although drawing 10 and drawing 12 explained the case of a busy terminal, and the case of a low engine-performance terminal as an independent example, it is possible also when both are doubled. In that case, it is arbitrary whether priority is given to a busy terminal by individual resending or priority is given to a low engine-performance terminal. For example, at the time of the waiting for the notice of busy discharge, mounting of resending a low engine-performance terminal can be altogether performed noting that a busy terminal is resent previously in principle.
[0072] Thus, according to this example, it is temporarily possible that it is non-receipt (busy) and for resending to the terminal which became, and the terminal which is not good as for a data receiving situation to decide to carry out by another treatment, when the convenience of a server is good, and to carry out by giving priority to transmission to a large majority of normal terminals and resending.
[0073]
[Effect of the Invention] according to this invention, in a server, resending only the data which have not been received to the terminal concerned after data transmission to a normal terminal and resending termination cuts by memorizing the condition and receive state of a busy terminal and a low engine-performance terminal, carving the condition of the terminal concerned with a normal terminal, and managing it as mentioned above. Consequently, preventing resending of the useless data to a busy terminal and a low engine-performance nature terminal, priority is given to data transmission to a normal terminal, and resending, and the data transmission efficiency to the whole a large number terminal is raised.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the data resending approach and a server, and especially, when a server performs data transmission by a multicast (destination assignment multiple address) etc. to two or more terminals and there are loss and the error of received data, it relates to the data resending approach and server which resend to a terminal from a server.

[Translation done.]

PRIOR ART

[Description of the Prior Art] In the data communication to which a server generally transmits data to two or more terminals After the server of a transmitting side divides a series of data into the data (it is hereafter called a packet) of suitable magnitude and transmits to two or more terminals, each terminal Returning to a server by making information about acknowledge of normal reception, or non-received data into a negative acknowledge, a server resends a packet to two or more terminals based on these responses again.

[0003] Drawing 14 is drawing showing the data resending sequence to conventional two or more terminals. After a server carries out data transmission to two or more terminals, a response is returned from each terminal, a server generates resending data based on these responses, and having repeated the procedure of performing data resending is shown.

[0004] In this drawing, data transmission is performed from a server to three terminals of terminals 1, 2, and 3. Thereby, the purport of normal reception or abnormality reception is answered from a terminal. Here, since it is only a terminal 1, it resends data to terminals 2 and 3 that there was a normal response as a result of a server's carrying out data transmission at terminals 1, 2, and 3. Here, although there was a response of the purport of normal reception from a terminal 2, since it is the abnormality response from a terminal 3, again, a server generates resending data and resends data for the data concerned to a terminal 3.

[0005] Moreover, in the conventional description, temporarily, with it being non-receipt (busy), when the notice of a busy is transmitted, interruption of data transmission to the busy terminal concerned is required from a server, when it becomes, and the terminal concerned becomes ability ready for receiving, the data resending method with which a terminal transmits the notice of busy discharge has a terminal. Drawing 15 shows the data resending sequence by the conventional notice of a busy. If a server receives the notice of a busy from the terminal (busy terminal) which became non-receipt temporarily during data transmission, data transmission to the terminal concerned is interrupted, and after receiving the notice of busy discharge from the terminal concerned, the procedure which resumes data transmission is shown.

[0006] In this drawing, when a server transmits data to a terminal, since the terminal is busy, it is the example which is in a non-receipt condition temporarily. In this case, since the notice of a busy is published from a terminal even if it transmits data from a server, a server will interrupt data transmission, if this notice of a busy is received. Furthermore, if a terminal changes in the ready-for-receiving ability condition, the notice of busy discharge will be transmitted to a server. Thereby, a server resumes transmission of data to a terminal.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] according to this invention, in a server, resending only the data which have not been received to the terminal concerned after data transmission to a normal terminal and resending termination cuts by memorizing the condition and receive state of a busy terminal and a low engine-performance terminal, carving the condition of the terminal concerned with a normal terminal, and managing it as mentioned above. Consequently, preventing resending of the useless data to a busy terminal and a low engine-performance nature terminal, priority is given to data transmission to a normal terminal, and resending, and the data transmission efficiency to the whole a large number terminal is raised.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, when the notice of a busy is received from the terminal which has a server when using combining the two above-mentioned conventional methods, if status management is performed to other normal terminals and EQCs, since data transmission to the normal terminal which are not other busies, and resending will also interrupt this terminal, a server has the problem that the effectiveness of the whole data communication falls remarkably.

[0008] Moreover, in the same situation, if the communication link to the terminal concerned is removed from status management, it is necessary to redo resending to the terminal concerned from the beginning also including data [finishing / reception], and the communication link effectiveness to the terminal concerned will fall remarkably. Moreover, in the method of the former of the above-mentioned conventional technique, there is a problem that the data communication effectiveness to the whole terminal falls as it will be dragged by the receiving engine performance of this terminal and the count of resending will increase, if the terminal which is not good as for a data receiving situation is treated to many of other normal terminals and EQCs.

[0009] Moreover, in the same situation, if the communication link to the terminal concerned is removed from status management, it is necessary to redo resending to the terminal concerned from the beginning also including data [finishing / reception], and the communication link effectiveness to the terminal concerned will fall remarkably. Especially the above problem manifests itself, when a server performs data resending in the multicast communication link which performs the multiple address to two or more terminals by the transmitting processing which is 1 time.

[0010] When the convenience of a server is good, resending to the terminal which this invention was made in view of the above-mentioned trouble, and gave priority to transmission to many normal terminals, and resending, and became a busy, or a terminal with the low receiving engine performance It aims at offering the data resending approach and server which priority is given to transmission to many normal terminals, and can perform it, making it possible to resend only non-received data to the terminal concerned, and mitigating the resending data to the terminal concerned, without resending data [finishing / reception].

[Translation done.]

MEANS

[Means for Solving the Problem] In the data resending approach that this invention resends data again when a server performs data transmission to two or more terminals connected through a communication network and this terminal cannot receive all the data A server gives priority to transmission to many normal terminals, and resending, performs data transmission (step 1), and when the convenience of a server is good, it resends only non-received data to the terminal used as a busy, or a terminal with the low receiving engine performance (step 2).
[0012] moreover, one or more individuals [condition / of a normal terminal] in case this invention performs status management of each terminal in a server -- something unusual -- voice management -- being derived -- the status management of a normal terminal -- being parallel -- an individual -- something unusual -- voice management is also performed. Drawing 1 is drawing for explaining the principle of this invention.
[0013] When the notice of a busy is received from the terminal which became non-receipt temporarily in this invention, a server (Step 2), Record the condition of a terminal, record the condition of a terminal, and the situation of non-received data, and it considers as individual status management with the another condition of other normal terminals (step 3). When the notice of busy discharge which shows that it became ability ready for receiving from the terminal is received, when the convenience of a server is good, with reference to the condition of (step 4) and a terminal, and the situation of non-received data, the data to a terminal are resent based on this record (step 5).
[0014] Moreover, in this invention, when the receiving situation of a terminal is not good, a server makes this terminal individual status management different from the condition of other normal terminals, records the condition of the terminal concerned, and the situation of non-received data, and when convenience of a server is good, it resends the data to the terminal concerned based on record.
[0015] Drawing 2 is the principle block diagram of this invention. In the server 100 which resends data again when this invention performs data transmission among two or more terminals connected to a communication network and this terminal cannot receive all the data A server 100 has the management tool 10 which divides transmission to a normal terminal and the status management of resending, and the status management of the terminal which published the notice of a busy, and the terminal judged that the receiving engine performance is low, and performs them, and a transmitting means 30 to perform data transmission to a terminal based on a management tool 10.
[0016] The above-mentioned management tool 10 has a normal terminal management means 40 to manage the condition of the normal terminal which carried out normal reception of the transmit data, and the individual management tool 20 which manages a busy condition, a busy discharge condition, and a low engine-performance condition according to an individual, respectively. The above-mentioned management tool 10 shifts management to the individual management tool 20, when the terminal managed with the normal terminal management means 40 changes from an all seems well to an abnormal condition, and when the terminal managed with the individual management tool 20 changes to an all seems well, it has further a status management shift means to shift to the normal terminal management means 40. The above-mentioned individual management tool 20 has the resending management tool 21 which will memorize reception and un-receiving if the notice of a busy is received from a terminal, and a terminal status management means 22 to manage ** in which data resending is possible if it manages that it is busy if the notice of a busy is received from a terminal and the notice of busy discharge is received. [of the packet in a terminal]
[0017] The 1st low engine-performance judging means 23 which judges whether this terminal is the low engine

performance when the above-mentioned individual management tool 20 has a negative acknowledge to transmit data from a terminal, The 2nd low engine-performance judging means 24 judged from a terminal to be a low engine-performance terminal when there is no response to transmit data, and there is no response exceeding the time-out of a predetermined count, In the 1st low engine-performance judging means 23 or the 2nd low engine-performance judging means 24, it has an exclusion means 25 to except the terminal judged to be the low engine performance from the normal terminal management means 40.

[0018] Data are resent to the terminal judged that the above-mentioned transmitting means 30 can be transmitted individual among the terminal of the issue origin of the notice of a busy which is made to give priority to data transmission to the normal terminal managed in the normal terminal management means 40, and is managed by the individual management tool 20 subsequently to [after completing transmission to a normal terminal], or a low engine-performance terminal.

[0019] Moreover, the identifier of a non-received packet is included in the notice of busy discharge. It is solved by performing status management apart from a normal terminal by the above to the terminal judged that the terminal and the receiving engine performance which the notice of a busy was received apart from transmission to a normal terminal and the status management of resending in the server 2 are low. Specifically, it is as follows.

[0020] In a server 100, even after judging it after the notice reception of a busy, and as the low engine performance with the time of a terminal status management means 22 to memorize the conditions (a busy condition, a busy discharge condition, a low engine-performance condition, normal state, etc.) of a terminal, and a normal state, the resending management tool 21 which memorizes reception / un-receiving is formed. [of each packet in the terminal concerned]

[0021] Moreover, 1st and 2nd low engine-performance judging means 23 and 24 to set 100 to a server and to judge that a terminal is in a low engine-performance condition is established. When the notice of a busy is received from a terminal, a server 100 records that the terminal concerned became a busy on the terminal status management means 22, and holds record of reception / non-receive state of each packet as it is in the resending management tool 21. (The latest receiving situation of the terminal concerned is recorded by the negative acknowledge.) When there is no negative acknowledge, not all packets have received. Thereby, the condition and packet receiving situation of a busy terminal are manageable in distinction from a normal terminal henceforth.

[0022] A server 100 excepts the terminal concerned from a normal terminal, and continues transmission to other terminals, and resending. If a busy terminal takes out the notice of busy discharge to a server when it becomes ability ready for receiving, and a server receives the notice of busy discharge, it will record that busy discharge of the terminal was carried out in the terminal status management means 22. Including the number of a non-receive packet in the notice of busy discharge, the server breaks and holds record of reception / non-receive state of the packet of a resending management tool.

[0023] A server performs data resending to the busy discharge terminal by which busy discharge is carried out with reference to the terminal status management means 22 after transmission to a normal terminal, and resending termination when self convenience is good. About the busy terminal by which busy discharge is not carried out, a server is resent, after waiting until the notice of busy discharge comes. Although waited predetermined time by the timer supervision about the notice waiting of busy discharge in this server, a communication link is closed about the terminal which carried out the time-out.

[0024] In the 1st and 2nd low engine-performance judging means 23 and 24, a server judges the terminal concerned based on the situation of the negative acknowledge from a terminal, and not answering to be a low engine-performance condition, and records that the terminal concerned became the low engine performance on the terminal status management means 22, and holds record of reception / non-receive state of each packet as it is in the resending management tool 21. (The latest receiving situation of the terminal concerned is recorded by the negative acknowledge.) When there is no negative acknowledge, not all packets have received. Thereby, the condition and packet receiving situation of a low engine-performance terminal are manageable in distinction from a normal terminal henceforth.

[0025] It does not wait vague long time, but especially that of a non-answered time-out is judged with the low engine performance, when it presses for a response, count permission of a convention of the time-out is carried out and this count is exceeded by the inquiry packet. Since it can judge with the low engine performance clearly by this, it judges

for a short time rather than it stands by vaguely, and it can change to transmission (it is multicast resending in the case of a multicast) to the normal terminal of the next round, efficient data resending can be performed.
[0026] A server performs data resending to a low engine-performance terminal after transmission to a normal terminal, and termination of resending, when self convenience is good. As for to any priority shall be given between resending to a busy terminal, and resending to a low engine-performance terminal, plans may differ for every system. It is efficient when resending to a low engine-performance terminal is performed at the idle time of the waiting for busy discharge.
[0027] By the above, a server gives priority to data transmission to a normal terminal, and resending, and it can resend only non-received data, without resending data [finishing / reception] also to a busy terminal and a low engine-performance terminal. Consequently, it is not necessary to redo resending to a busy terminal and a low engine-performance terminal from the beginning, and the effectiveness of the whole data communication can be raised, without interrupting data transmission to a normal terminal, and resending, or carrying out performance degradation.
[0028]
[Embodiment of the Invention] Hereafter, the example of this invention is explained using a drawing. Drawing 3 shows the information communication link system configuration which applied this invention. The system shown in this drawing consists of a server 100, a communication network 200, and two or more terminals 300. The system of this drawing shows signs that the negative acknowledge which includes the acknowledge or resending information on the confirmation of receipt from each terminal 300 is returned, after a server 100 transmits data to two or more terminals 300.
[0029] Drawing 4 shows the outline of actuation of this invention. In the server, signs that the status management according to individual is derived are shown from the status management of a normal terminal. This drawing shows the system which performs data transmission from a server 100 to four terminals 300-1,300-2,300-3,300-4.
[0030] To the beginning, the individual status management of the terminal 300 concerned is started by the specific event in a server 100. In parallel with management of a normal terminal, one or more individual status management is performed. For example, in drawing 4 , when a server 100 receives the notice of a busy, status management is begun by using the terminal 300-3 concerned as a busy terminal. When a server 100 judges with the low engine performance, the status management as a low engine-performance terminal of the terminal 300-4 concerned starts. In any case, the status management of other normal terminals 300-1,300-2 continues.
[0031] In drawing 4 , if a server 100 performs data transmission to a terminal 300-1,300-2,300-3,300-4, from a terminal 300-1,300-2, a normal notice (notice of the completion of data reception) will be received, and the notice of a busy will be received from a terminal 300-3. At this time, individual status management is performed as a busy terminal to a terminal 300-3. Furthermore, about a terminal 300-4, since individual status management was started since the notice of abnormalities arrived, and the time-out was repeated more than the count of predetermined, it shall judge with the low engine performance and individual status management shall be performed.
[0032] Drawing 5 shows the configuration of the server of this invention. The server 100 shown in this drawing consists of the resending control section 101, the communications control section 102, the application Management Department 103, the resending Management Department 104, the data configuration section 105, the terminal status management section 106, and the terminal engine-performance judging section 107.
[0033] The resending control section 101 performs data communication through the communications control section 102 based on the data Request to Send from the application Management Department 103. Transmit data is constituted in the data configuration section 105. At the resending Management Department 104, the packet receiving situation (received/distinction which is not received for every terminal of each packet to which the sequence number was attached) of all the terminals 300 is managed on the resending managed table 1041 shown in drawing 6 . The receiving situation of a busy terminal is also memorized by this. The resending managed table 1041 can show whether the packet corresponding to a packet number is reception ending (O), or it has not received (x) in each terminal, as shown in drawing 6 . A mounting top is realizable when it makes bit-off (0) corresponding to [x] corresponding to O for bit-on (1).
[0034] The resending managed table 1041 is used for management of the receiving situation (success or failure of packet reception) of the packet of each terminal for packet resending. The resending managed table 1041 can be shared at a normal terminal and a busy terminal, and a low engine-performance terminal. However, from a viewpoint of

processing effectiveness, when the individual status management of a busy terminal or a low engine-performance terminal starts, the line of the table about the terminal concerned can be copied, another table (only line) can be prepared for every terminal, and thereby, the resending situation of each terminal can also be managed. In this case, when individual resending of each terminal (a busy terminal, low engine-performance terminal) is completed, in the original resending managed table, the completion situation of data resending of the whole terminal can be grasped by reporting a result to the original resending managed table.

[0035] In the terminal status management section 106, it manages and memorizes whether it is in which conditions, such as a normal communication link condition, a busy condition, a busy discharge condition, and a low engine-performance condition, for every terminal. This analyzes the contents of the response frame from a terminal 300 through a communication network 200, and recognizes a condition.

[0036] The contents of the communication link frame are shown in drawing 7 . This drawing (A) is the frame of the inquiry which transmits from a server 100 to a terminal 300, and is constituted in the terminal destination P01, the server destination P02, and packet classification P0T. The server destination P02 sets up the address of the server of the dispatch origin at the time of an inquiry. Packet classification P0T distinguish the packet classification of the data of an inquiry by the integral value.

[0037] This drawing (B) shows the notice of a busy transmitted from a terminal 300 to a server 100, and consists of the server destination B01, a terminal ID 02, and packet classification B0T. Packet section classification B0T set up the classification of the notice of a busy by the integral value. This drawing (C) shows the notice of busy discharge transmitted from a terminal 300 to a server 100, and consists of the server destination 601, a terminal ID 602, packet classification 60T, and a non-receive-packet number train 603. Packet classification 60T set up the integral value which shows the classification of the notice of busy discharge here.

[0038] This drawing (D) shows the notice of the low engine performance transmitted from a center 100 to a terminal 300, and includes the server destination 601, a terminal ID 602, and the number train 602 of the non-receive packet in the notice sending-out time of busy discharge in each terminal. The number train of a non-receive packet is usually equivalent to the non-receive-packet number train included in a negative acknowledge from a terminal, and includes the numerical train, the suitable range notation, etc. Packet classification D0T set up the integral value which shows the classification of the notice of the low engine performance. Additional information D03 is additional information, such as a stage of individual resending, and the reception preparation of it is beforehand attained by knowing about what time data resending will be resumed in a terminal.

[0039] The terminal engine-performance judging section 107 judges whether based on the response from a terminal 300, the terminal concerned changed into the low engine-performance condition. Based on the situation of the time-out which is not answered [a negative acknowledge or], the terminal concerned is judged from a terminal to be a low engine-performance terminal, and the judgment result is notified to the terminal status management section 106. In addition, a non-answered time-out is judged with the low engine performance, when it presses for a response by the inquiry packet and a time-out exceeds the count of a convention.

[0040] Drawing 8 shows the resending sequence at the time of being judged with the busy terminal of this invention. In this drawing, when data are transmitted from a center 100, a terminal 300-3 shall be in a busy condition, and a terminal 300-1,300-2 presupposes that it is an all seems well. The terminal 300-3 concerned records that the server 100 would be in the busy condition for a server 100 to receive the notice of a busy from a terminal 300-3 during data transmission on the terminal status management section 106 (step 102). (step 101) A server 100 manages the condition of a terminal 300-3 apart from a normal terminal after this. As for a server, after record of a busy terminal continues the communication link of transmission to a normal terminal, resending, response reception, etc.

[0041] next, a terminal 300-3 to the notice of busy discharge -- receiving (step 103) -- as for a server 100, a terminal 300-3 records having changed into the busy discharge condition on the terminal status management section (step 104). The non-receive-packet number train included in the notice of busy discharge at coincidence is recorded on the resending managed table 1041 of the resending Management Department 104. As for a server 100, after record of busy discharge continues the communication link with the normal terminal 300-1,300-2 (step 105).

[0042] A server 100 resends non-received data to the terminal 300-3 of which the busy is canceled after completing the communication link to the normal terminal 300-1,300-2 (step 106). Drawing 9 shows the resending sequence at the time of being judged with the low engine-performance terminal of this invention. In this drawing, since a reception

response is not carried out from a terminal 300-3 when data are transmitted from a center 100, a center 100 explains the case where it judges with it being the low engine performance by a time-out etc.

[0043] The terminal 300-3 concerned records that the server 100 changed into the low engine-performance condition for a server 100 to judge a terminal 300-3 during response reception to be a low engine-performance terminal on the terminal status management section 106 (step 202). (step 201) The non-receive-packet number train included in the negative acknowledge from the terminal 300-3 at coincidence is recorded on the resending managed table 1041 of the resending Management Department 104. (When there is also no negative acknowledge, all packet un-receiving are recorded.) A server 100 is in a low engine-performance condition to the terminal 300-3 concerned, and it tells that data transfer was interrupted as a notice of the low engine performance again (step 203). A server 100 manages the condition of a terminal 300-3 apart from a normal terminal after this. As for a server, after record of a low engine-performance terminal continues the communication link of transmission to a normal terminal, resending, response reception, etc.

[0044] A server 100 resends non-received data to a terminal 300-3 after completing the communication link to a normal terminal (step 204) (step 205).

[Translation done.]

EXAMPLE

[Example] Below, the example of this invention is explained with a drawing. Drawing 10 is the example of the data resending procedure (flow chart) in the server which applied this invention. It is an example concerning the treatment of a busy terminal to the beginning.

[0046] Step 301 The resending control section 101 will initialize the terminal status management section 106 and the resending Management Department 104 to the data transmission concerned, if a data Request to Send is received from application 0 **** 103.

Step 302 The data configuration section 105 constitutes the first transmit data, carries out packet division and transmits it to the communications control section 102. The communications control section 102 starts transmission to a normal terminal for the transmit data by which packet division was carried out. Henceforth, the step concerned is processed until data transmission (transmission, resending, response reception, and response receiving waiting are included) to a normal terminal is completed.

[0047] Step 303 If the notice of a busy is received from a terminal 300 in the meantime, the terminal status management section 106 will record the busy condition of the terminal concerned, and will manage a busy terminal apart from the condition of a normal terminal. Immediately, it returns to processing of the data transmission to a normal state.

Step 304 Further, a server 100 records the situation of the non-receive packet of a terminal on the resending Management Department 104 based on the number of the non-receive packet of the notice of busy discharge while recording busy discharge on the terminal status management section 106, if the notice of busy discharge is received.

[0048] It is also possible to receive the notice of a busy from the terminal which published the notice of busy discharge once again, and the condition of a terminal is again recorded as a busy condition in the step concerned in this case. When all data transmission to a normal terminal is completed, it moves to the processing step 305 of individual resending to a busy terminal.

[0049] Step 305 A server 100 resends a non-receive packet with reference to the resending managed table 1041 to the busy terminal which has received the notice of busy discharge at step 304. During individual resending to a busy terminal, it is possible to receive the notice of a busy from a terminal [finishing / busy discharge] including the terminal under resending, and the condition of the terminal concerned is recorded as a busy condition at step 306.

[0050] Step 306 It is possible to receive the notice of busy discharge from the terminal of a busy condition during individual resending of a busy terminal.

Step 307 When the notice of busy discharge is notified from a terminal, while recording busy discharge, based on the number of the non-receive packet of the notice of busy discharge, the situation of the non-receive packet of a terminal is recorded on the resending Management Department 104.

[0051] When discriminating resending to a busy terminal is completed, all data transmission is ended. In addition, on mounting, when there are two or more busy terminals, although every one resending processing to a terminal can be performed, resending to two or more busy terminals can also be performed to juxtaposition. Drawing 11 is a sequence chart which shows actuation of data resending in case there is a busy terminal of one example of this invention. .

[0052] Step 401 First, if the data for transmission are passed to the resending control section 101 from the application Management Department 103 of a server, by the resending control section 101, initial setting will be performed for the resending Management Department 104 and the terminal status management section 107. If transmit data is acquired,

the data configuration section 105 will carry out packet division of the data concerned, will give the address of a destination terminal, and will transmit Data a to Terminal A, Terminal B, and Terminal C through the communications control section 102.
[0053] Step 402 Here, to transmit data a (packet number "1"), a server 100 has the response of normal reception from Terminal A, and receives the notice of a busy from Terminal B and Terminal C.
Step 403 The terminal status management section 106 will record that Terminals A and B are in a busy condition, if the purport that Terminal B and Terminal C concerned are busy is received through the resending control section 106. Furthermore, if the resending Management Department 104 is notified of the condition of Terminals B and C, "x" which shows un-receiving will be recorded on the column of the data a of the terminals B and C of the resending managed table 1041. If the resending Management Department 104 is notified of the condition of Terminal A, "O" will be recorded on the resending Management Department table 1041.
[0054] Furthermore, when the server 100 received Terminal B and the notice of C busy, it records that the terminals B and C concerned are in a busy condition on the terminal status management section 106.
Step 404 In the above-mentioned step 402, when normal reception of the data transmission is being continued and carried out to the normal terminal A which is carrying out normal reception, this processing is repeated.
[0055] Step 405 A server 100 receives the notice of terminal B busy discharge in a busy condition.
Step 406 With reference to the resending managed table 1041 of the resending Management Department 104, a server 100 recognizes the packet (the packet which has given x to the resending managed table: here, consider as Data a) which is not transmitted to the terminal B concerned, acquires the data a concerned, and resends Data a to the terminal B1" concerned after transmitting termination of the normal terminal A.
[0056] Step 407 The notice of terminal C busy discharge is received further here.
Step 408 A server 100 is the same approach as the above-mentioned step 405, and resends Data a. Thus, in resending data, the condition of data reception of a terminal or not receiving is managed in the resending managed table 1041 of the resending Management Department 104, and it determines the necessity of resending with reference to the table 1041 concerned. Moreover, management with a busy terminal is performed in the terminal status management section 106, for example, when a terminal 300 is busy, it is referred to as bit =1, and it will be referred to as bit =0 if the notice of busy discharge is received from a terminal 300. If this notice of busy discharge is received, since data resending will be attained, with reference to the resending managed table 1041, timing with the sufficient convenience of a server 100 is chosen, and data are resent to the terminal 300 concerned.
[0057] Next, the example which resends data to the terminal judged to be the low engine performance is explained. Drawing 12 is the flow chart of the data resending actuation to a low engine-performance terminal from the server of one example of this invention.
step 501 the resending control section 101 -- an application -- if a data Request to Send is received from the KESHI Management Department 103, the terminal status management section 106 and the resending Management Department 104 will be initialized.
[0058] Step 502 The data configuration section 105 constitutes the first transmit data, carries out packet division and transmits it to the communications control section 102. The communications control section 102 starts transmission to a normal terminal for the transmit data by which packet division was carried out. Henceforth, the step concerned is processed until data transmission (transmission, resending, response reception, and response receiving waiting are included) to a normal terminal is completed.
[0059] Step 503 The terminal engine-performance judging section 107 acquires the negative acknowledge concerned from the resending control section 101, and a server 100 judges the condition of the terminal 300 of response transmitting origin, when the response from the terminal 300 over data transmission is stood by and a negative acknowledge occurs from a terminal 300.
[0060] Step 504 When the terminal which published the negative acknowledge is judged in the terminal engine-performance judging section 107 to be a low engine-performance terminal, the terminal status management section 106 records the purport whose terminal concerned is a low engine-performance terminal. Furthermore, through the communications control section 102, the purport used as low engine-performance treatment is notified to the terminal concerned, and it tells that resending became deferment to it.
[0061] Step 505 When n times of time-outs are set up and the count of a time-out exceeds n times again about the

terminal 300 which transmitted data, it judges with the low engine performance. Here, when judged with the low engine performance, it shifts to step 506 and shifts to step 509 except it.
[0062] Step 506 About the terminal 300 used as a time-out, it judges whether individual resending is possible. The resending Management Department 104 will shift to step 508, if the terminal concerned completely comes to have received the packet with reference to the resending managed table 1041, and if at least one packet is received (at least one O is in a packet number in a resending managed table), it will shift to step 507 as individual resending being possible.
[0063] Step 507 In step 506, when judged with individual resending being possible, with reference to the resending managed table 1041, it records carrying out individual resending for a low engine-performance condition, notifies having become the terminal concerned with individual resending treatment by the notice packet, and prepares for individual resending.
[0064] Step 508 In step 506, when the terminal concerned has not received the packet at all, even if it resends more than it, it judges with that ineffective, and the terminal concerned is excepted from the object of resending.
Step 509 If it is less than a regular timeout count in step 505, it will ask a non-answered terminal (there may be more than one), a packet will be sent out, and it will press for a response, and will become the waiting for a response.
[0065] Step 510 When data transmission to a normal terminal is completed, individual resending to a low engine-performance terminal is performed. Actuation in case the above-mentioned low engine-performance terminal exists is explained. Drawing 1313 is the sequence chart of the data resending actuation about the low engine-performance terminal of one example of this invention.
[0066] Step 601 Data a are transmitted to Terminal A, Terminal B, and Terminal C from a server 100, respectively.
Step 602 A response is received from Terminal A and Terminal B. Although the response from Terminal A was a response which shows normal reception among these responses, suppose that it is the response from Terminal B a negative acknowledge. Thereby, the terminal status management section 106 makes Terminal A normal terminal management.
[0067] Step 603 A server 100 judges, in this example, judges whether in the terminal engine-performance judging section 107, the negative acknowledge concerned shows the low engine performance about the response of Terminal B to be the low engine performance, and excepts it from normal terminal management. Therefore, in the terminal status management section 106, Terminal B is considered as individual management as an abnormality terminal.
[0068] Step 604 The data configuration section 105 sets it as Terminal B that data resending to the terminal concerned became deferment as additional information in the packet of drawing 8 (D), and transmits to Terminal B.
Step 605 A server 100 sends out Data b and c to the terminal A which is a normal terminal in the meantime.
[0069] Step 606 The server 100 was supervising the time-out of Terminal C, and detected the time-out at this time.
Step 607 Since the count of this time-out is over the predetermined count n, the terminal engine-performance judging section 107 judges with it being unreceivable even if it resends data to the terminal C concerned, and is excepted from management of the terminal status management section 106.
[0070] Step 608 A server 100 transmits Data d to the normal terminal A.
Step 609 A server 100 resends Data a to Terminal B. In this example, when all individual resendings to a low engine-performance terminal are completed, data transmitting processing is completed.
[0071] In addition, on mounting, when there are two or more low engine-performance terminals, although every one resending processing to a terminal can be performed, resending to two or more low engine-performance terminals can also be performed to juxtaposition. As mentioned above, although drawing 10 and drawing 12 explained the case of a busy terminal, and the case of a low engine-performance terminal as an independent example, it is possible also when both are doubled. In that case, it is arbitrary whether priority is given to a busy terminal by individual resending or priority is given to a low engine-performance terminal. For example, at the time of the waiting for the notice of busy discharge, mounting of resending a low engine-performance terminal can be altogether performed noting that a busy terminal is resent previously in principle.
[0072] Thus, according to this example, it is temporarily possible that it is non-receipt (busy) and for resending to the terminal which became, and the terminal which is not good as for a data receiving situation to decide to carry out by another treatment, when the convenience of a server is good, and to carry out by giving priority to transmission to a large majority of normal terminals and resending.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing for explaining the principle of this invention.
[Drawing 2] It is the principle block diagram of this invention.
[Drawing 3] It is the information communication link system configuration Fig. which this invention applies.
[Drawing 4] It is drawing showing the outline of actuation of this invention.
[Drawing 5] It is the server block diagram of this invention.
[Drawing 6] It is drawing showing the example of the resending managed table which the resending Management Department of this invention has.
[Drawing 7] It is drawing showing the example of a configuration of the communication link packet of this invention.
[Drawing 8] It is drawing showing the sequence of data resending at the time of being judged with the busy terminal of this invention.
[Drawing 9] It is drawing showing the data resending sequence at the time of being judged with the low engine-performance terminal of this invention.
[Drawing 10] It is the flow chart which shows actuation of data resending to the busy terminal from the server of one example of this invention.
[Drawing 11] It is the flow chart which shows actuation of data resending in case there is a busy terminal of one example of this invention.
[Drawing 12] It is the flow chart of the data resending actuation to a low engine-performance terminal from the server of one example of this invention.
[Drawing 13] It is the sequence chart of the data resending actuation about the low engine-performance terminal of one example of this invention.
[Drawing 14] It is drawing showing the data resending sequence to conventional two or more terminals.
[Drawing 15] It is drawing showing the data resending sequence by the conventional notice of a busy.
[Description of Notations]
10 Management Tool
20 Individual Management Tool
21 Resending Management Tool
22 Terminal Status Management Means
23 1st Low Engine-Performance Judging Means
24 2nd Low Engine-Performance Judging Means
25 Exclusion Means
30 Transmitting Means
40 Normal Terminal Management Means
100 Server
101 Resending Control Section
102 Communications Control Section
103 Application Management Department
104 Resending Management Department